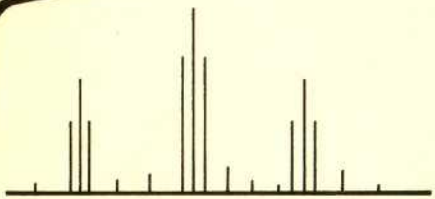
CQ-TV MAGAZINE No. 124

BRITISH AMATEUR TELEVISION CLUB

NOVEMBER 1983



A spectrum analyser

Quality video from the BBC micro

Printed circuits explained

also...

- WIRE-LINE FOR MICROWAVES
- TWO MODULATORS
- A TV ALARM
- A TV SCANNER
- CALLSIGN INSERT etc, etc.....

BUMPER ISSUE

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MEMBERSHIP

FULL YEAR: £4 or £1 for each remaining quarter of the year.
All subscriptions fall due on the first of January each year. Overseas members are asked not to send foreign cheques please.

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CLOSE FOR PRESS DATE FOR THE FEBRUARY ISSUE.....20th December 1983

EDITORS POSTBAG

Dear Ed

I recently completed construction of the TV camera in Practical Electronics (Sept.1974).
I would be delighted to talk to someone who has had 100% success with this camera. I've managed to get most of the thing complete, but am suspicious that the "Random Interlacing" is something which I don't understand fully, and which I believe is the problem with my camera.
Please will anyone who has completed this project phone me on 0954 80334 (evenings or weekends) or 01 831 6272 ext.4248 (office hours) or write to me at the address below.
Someone please help, it's keeping me off the air!

Dave Edwards G8NEO
111 The Spinney,
Bar Hill,
Cambridge CB3 8SU

Dear Ed,

I would like this opportunity to thank Trevor Brown and the BATC committee for making the TV83 show at the Post House on May 22nd such a superb exhibition.
People who brought along their projects, I think, made the day. Amateur television is one aspect of amateur radio that hasn't been devastated by the 'Black Box' Kings. Even if you purchase your transmitter and receive converter, there are still a huge number of projects and designs covering RF, video and logic circuitry many of which can be built with the minimum of test equipment and knowhow, and may confidently be attempted by the newcomer as well as the old hand.

Chris Lewis G6ACL

Dear Ed,

You may like to know of a new station (me) now operating from Somercotes in Derby. I would welcome skeds from anyone since I have not done too well so far.
My equipment includes a log periodic aerial, a M/M MTV435, a Fortop convertor and a Pye Lynx camera. I am rather new to all this and would appreciate any advice from members.

J.Stokes G6XMY
47 Riber Avenue,
Somercotes,
Derbyshire Tel: Ambergate 6159

(The following letter was received by the Membership Secretary and is typical of a number from the same source)

Your name was mentioned in a letter to "Movie Maker" by Ted Foreman of the Dartford Tape & Audio Society as a result of a letter I had written about amateur TV. I knew nothing about amateur TV - until it was mentioned in "Movie Maker" I never knew it existed - but if your Society publishes anything on the subject (such as descriptions of the equipment and licenses required, how one can receive the pictures etc) I should be grateful to receive details.

John Ward
Leigh-on-Sea,
Essex.

Dear Ed,

A point which occurred to me recently is that the relatively long time between issues of CQ-TV means that topical items are dated by the time they appear in print.
Now I can appreciate the

difficulties of producing a magazine of the quality of CQ-TV, and believe that once a quarter is about right to ensure it is welcome when it does appear. But what about a short newsletter more regularly, along the lines of "TV on the air" with details of events of interest such as contests and expeditions... maybe it would encourage people to take to the hills! It would also allow ads to be published timely, with some chance of the goods still being available when the ad appears. A phone-in number for short news items would also be worthwhile I feel. (See CQ-TV118 p2 and 119 p3. Ed).
Perhaps you have already discounted these ideas, but I thought I'd throw them in anyway. As one of GM's more active ATV'ers I am constantly frustrated by the very limited part I can play in the BATC, perhaps I need to foster the creation of a GM Video Group!

Norrie Macdonald GM4BVU

NEWS ROUNDUP

G6JAT JOINS CQ-TV

A new member to the CQ-TV team is Tony Marsdon G6JAT. Tony offered his assistance in response to my plea in the last issue and has been put to work in double quick time. Tony has edited some of the articles in this issue as well as preparing some of the artwork.
Welcome aboard Tony, may you stay with us for a long time.
Another offer was received from L.Devaney. This gentleman (Christian name not known!) is 'into' slow-scan TV and NBTV and I hope therefore that he will be able to help with some material for those modes. Such material (especially SSTV) has been sadly lacking for a long time.

CONVENTION 1984

20th MAY

Members attending the last couple of BATC shows at Leicester will appreciate that more space is needed for displays and visitors, consequently the committee has visited a larger Post House Hotel complex at Crick near Rugby. After a conducted tour of the facilities, the committee agreed that this new venue would be suitable for the 1984 Convention due to be held in the late spring.
The facilities include larger display rooms and lecture theatres, a reception foyer, better catering and resturant facilities and lots of room outside for special displays, junk stalls and several acres of grassland and gardens where children may play and families can have picnic lunches well away from any roads. The Hotel is adjacent to the M1 (J18) and is set in pleasant rural surroundings.
Full details will appear in the next issue.

MORE PUBLICITY

The BATC has been publicised quite widely recently. Several magazines have carried mentions or pieces on ATV and they are promoting a considerable amount of interest judging by the upsurge in membership applications. In particular R&EW carries a regular column devoted to ATV written by Andy Emmerson G8PTH in which Club membership details are often given.
The October issue of 'Television' magazine carries a nice plug for ATV and the BATC from Roger Bunney in his regular DX-TV column. Items like these usually bring in a crop of enquiries and have contributed in no small way to the fact that club membership is currently around 2000 - the highest by a long way in the club's history.

SUBSCRIPTIONS ARE DUE.

Please note that ALL subscriptions for 1984 become due on the 1st of January, please use the renewal form which accompanies this issue and return promptly.
Those members who have already paid their 1984 subscription before the end of September should not receive a form with this issue, if you have - or have not paid but have not received a form - would you please contact the Membership Secretary at; 'Grenehurst', Pinewood Road, High Wycombe, HP12 4DD as soon as possible.

BUMPER ISSUE

You will notice that this issue carries more pages than usual. The reason for this is that you have been kind enough to send in lots of material for publication. I have made this issue larger in order to include some items which are in danger of being held over for too long.
Do keep sending in items though, no matter how small (see how many 'shorts' and 'one-pagers' there are in this one) it's the only way I can give you lots to read.

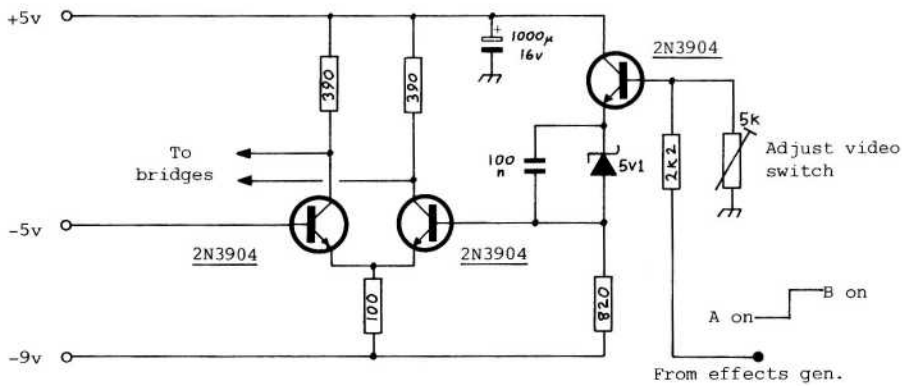
VISION MIXER NOTES

In the course of building another ABC mixer to the design in CQ-TV 115 & 116, an error has been noticed in one of the circuit diagrams.

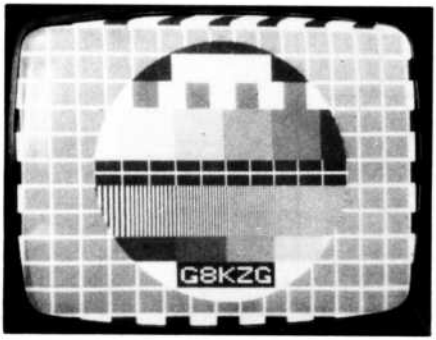
The error is in Fig.6 (CQ-TV 116, p35) and shows the 820-ohm resistor in series with the 5.1volt zener returned to the -5volt line whereas it should be returned to the -9volt line. Also the long-tail-pair switches more positively if the emitter resistor is reduced to 100-ohm.

The modified portion of Fig.6 is shown below.

The 'Ref' output transistor adjacent to the lower 78L05 regulator and the video output transistor in the mix/amp should both read BC147 and not BC157 as shown.



MODIFIED CIRCUIT FROM CQ-TV 116 (p 35).



CALLSIGN INSERT

By Peter Delaney G8KZG

The photograph shows the colour test card described in Handbook 1 but with a callsign inset based on a design by G8ABD which appeared in CQ-TV 118.

In practice it will be found that the circuit needs to be altered slightly as shown in Fig.1. H6 is correctly timed but is upside down. If H8 is taken instead, to pin 14 of the PROM the timing error does not matter because the callsign generator output is gated by the letterbox signal.

A printed circuit board design to suit this circuit is also shown in Fig.2. The use of a socket for the PROM is recommended - apart from anything else, it enables a new or special event call or message to be inserted. The circuit should be 'wired in' using ribbon cable.

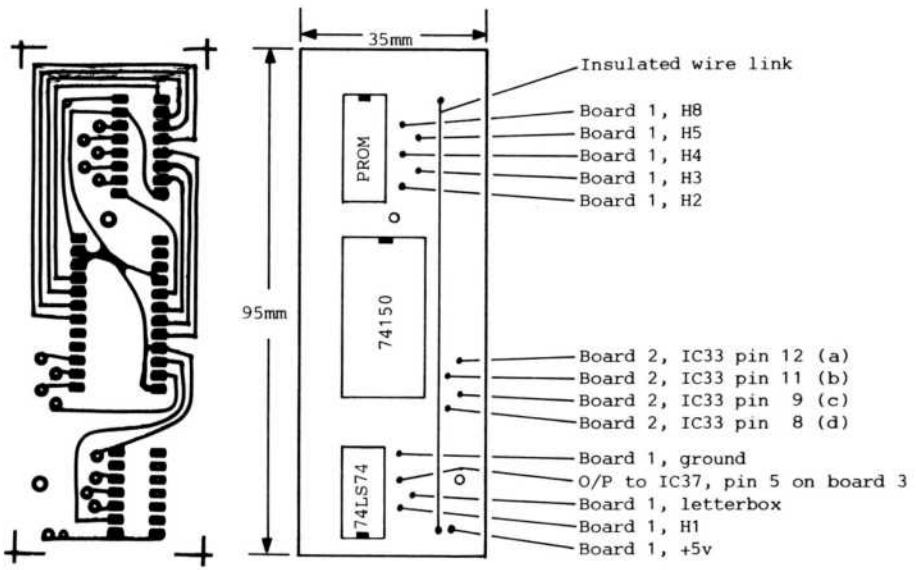


Fig.2 PC BOARD PRINT PATTERN AND COMPONENT LAYOUT

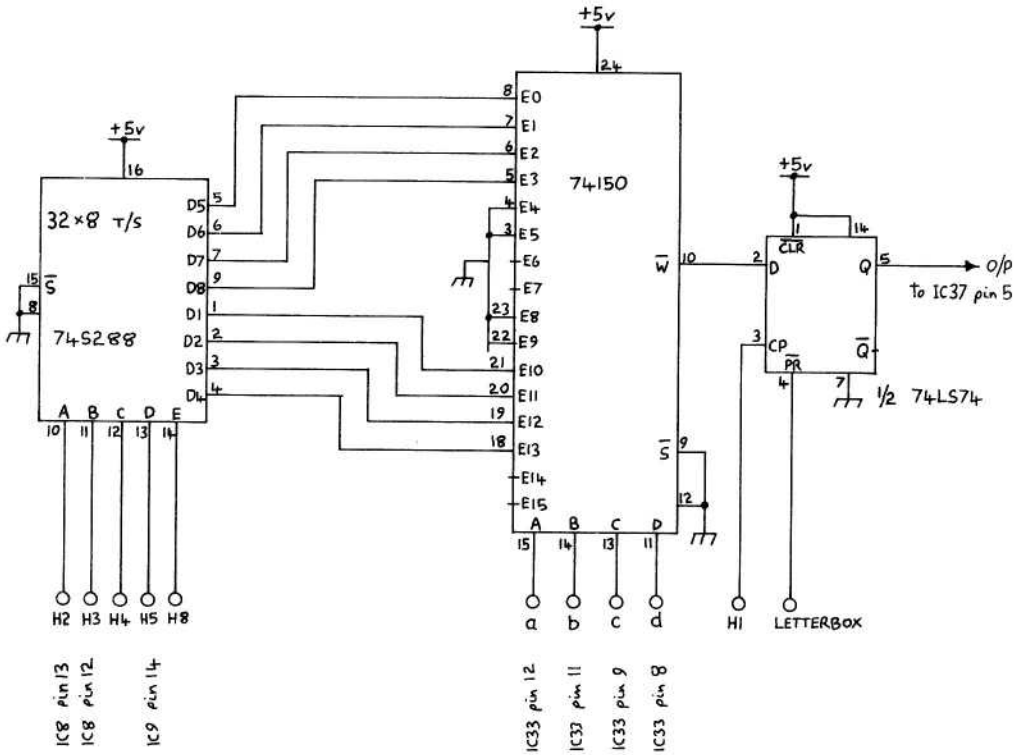


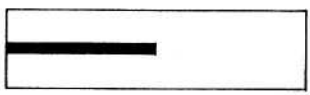
Fig.1 MODIFIED CIRCUIT DIAGRAM FROM CQ-TV 118

TESTING

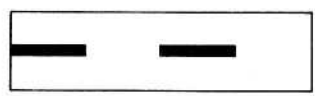
The circuit may be tested without the PROM, proceed as follows:

a) Use a wire link across the PROM socket to connect pin 8 to each of pins 1 to 7 and 9 in turn. If the circuit is correct, this will result in a white box with a horizontal black line in sequence from top (pin 1) to bottom (pin 9).

b) Use a wire link across the PROM socket to connect pin 4 in turn to each of pins 10 to 14. If the circuit is correct this results in a white box with a line of dashes, horizontally, half way down. For example:-



Pin 4 to pin 14



Pin 4 to pin 13

Using pin { 12 results in 4 bars
11 results in 8 bars
10 results in 8 bars

If the callsign is to be turned on and off, then connect pin 9 of the 74150 to either ground (for on) or +5v (for off) via a switch.

PROM PROGRAMMER

For those needing to construct a PROM programmer, it should be noted that the design in CQ-TV118 suits the 74S188 only. A design for the 74S288 is shown in Fig.3.

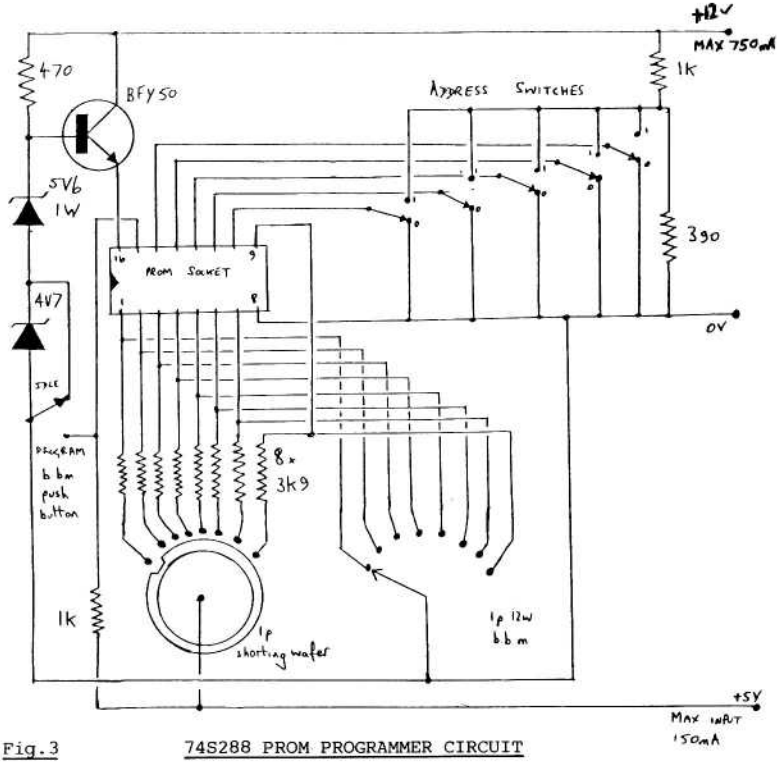


Fig.3 74S288 PROM PROGRAMMER CIRCUIT

Texas Instruments recommend disconnecting power in order to keep the chip cool. A suitable routine seems to be to set up the address switch, apply power, select output, press button for one second, select the next output for the same address, press the button etc. until all bits at one address setting are programmed. Remove power, let the chip cool, set the new address code

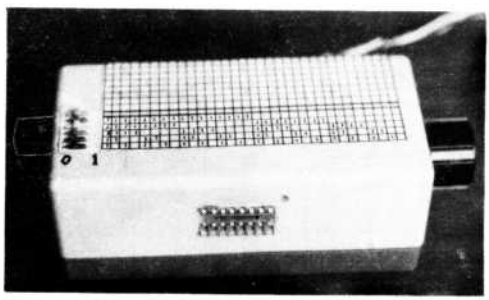
and continue as before. The PROM makers state "only one programming attempt per bit is recommended" - however, provided the chip cools completely first it is possible to try again if a block does not 'blow' correctly.

A programmer can conveniently be made using miniature DIL switches for the address codes, alongside the program chart and making the output selector from a 'maka-switch' system with resistors between the wafers.

Texas Instruments PROMS are now supplied with new numbers:-

74S288 is now TBP18 S 030
74S188 is now TBP18 SA 030

Other makers equivalents, ONCE PROGRAMMED are:- 82S123, 6331, 7603, 5610, and 27S19 but if these devices are contemplated the details on programming them should be checked.



PROM PROGRAMMER

DIL switch sets address codes.
Large knob sets outputs.
Idle/program button is on the left.

WIRE-LINE FOR MICROWAVES

by Robert C. Wilson KL7ISA and Hal Silverman W3HWC

In our branch of the Communications Satellite Corporation (COMSAT), radio amateurs are not plentiful. So when the authors met and found that a common interest in amateur microwave techniques existed, we formed a lunchtime technical society at the plant. After a lot of discussion, research and breadboarding, we came up with a new technique that will certainly put microwave circuit construction within easy reach of any amateur.

"Wire line" is a greatly simplified transmission line construction technique which does not require extreme precision or pc-board etching and uses commonly available parts and tools. By using only a soldering iron, diagonal cutters and a ruler, it is possible to build microwave mixers, oscillators, super-regenerative detectors and other microwave RF circuits with surprisingly good results.

THEORY

Transmission line circuits are necessary at microwave frequencies to keep the circuit losses under control, to conduct the signals from one place to another and to match one circuit to the next. One of the more popular microwave transmission line techniques is called stripline. Stripline employs an etched copper strip transmission line over a ground plane. Literature is available describing stripline techniques and circuit design. Much of this information may be useful in understanding wire line techniques.

The wire line approach employs single-wire transmission lines using a groundplane image. Theory indicated that there was no reason this technique would not work at microwave as well as at audio frequencies. The formula

$$Z_o = \frac{138}{\sqrt{e}} \log_{10} \frac{4h}{d}$$

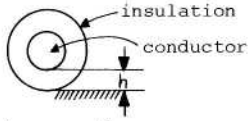
where
Zo = line impedance
e = dielectric constant of the medium
h = height above ground
d = diameter of wire

would closely approximate the final results.

If the wire is insulated and the insulation is brought into contact with the ground plane, a simple, stable and adjustable circuit element is formed. The spacing of the wire above the ground plane is determined by the insulation on the wire. We found that the effective value of the dielectric constant, e, may be adjusted to take into account the amount of the field both in the air and in the insulation.

Table 1

Required Wire Spacing for a 51.5-Ohm Impedance Line



Wire Guage (AWG)	*Diameter (in.)*	*Dielectric Constant (e)* 1	2	3	4	5
12	0.080	0.007	0.027	0.049	0.072	0.097
14	0.064	0.006	0.022	0.039	0.057	0.077
18	0.040	0.004	0.014	0.024	0.036	0.048
22	0.002	0.002	0.009	0.015	0.022	0.030
30	0.010	0.001	0.003	0.006	0.009	0.012

The required wire-to-ground-plane spacing (h) in inches is shown below the various dielectric constant values. Inches x 25.4 = mm.

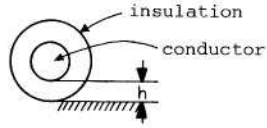
Experimental results indicated that a piece of no. 14 AWG, PVC-insulated house wire glued to a copper ground plane has an impedance of 58 ohms. This produces an effective dielectric constant of about 2 for PVC in this configuration. Table 1 shows the general range of results that may be expected using common wire sizes with varying types of insulation. Table 2 indicates that a maximum impedance in the range of 100-120 ohms is expected because of spacing and radiation problems; at the low end, 30 ohms could be considered a limit.

One item of interest is the double-stub tuner, a short section of transmission line about 3/8 wavelength long with an adjustable stub tuning line attached at either end. This produces a matching system much the same as a pi-network tuner, but one that will operate in the microwave range. Using small ceramic, glass or polypropylene tuning capacitors on the ends of the stub lines (each about 3/8 wavelength long) will allow a wide range of impedance matching. If a different impedance-matching range is necessary, the lines may be shortened or lengthened easily. Using this method, it is possible to "screwdriver adjust" most microwave circuits for best results.

Table 2

Spacing Versus Impedance Using No.14 Wire

Impedance (Z_0) in ohms	*Spacing (h) in inches*
30	0.006
40	0.019
50	0.036
70	0.089
100	0.256
120	0.481



This table gives the required spacing (h) in inches for no.14 AWG wire with a dielectric constant (e) of 3 to provide a specific impedance.
Inches x 25.4 = mm.

AN RF AMPLIFIER AND OSCILLATOR

Amplifiers that have been designed and built using wire line have surpassed expected results and have often exceeded the specification sheet gain for the transistor used. The amplifier shown in Fig.1 was built using ordinary house wire, polypropylene variable capacitors and an ion-implanted Motorola MRF901 transistor.

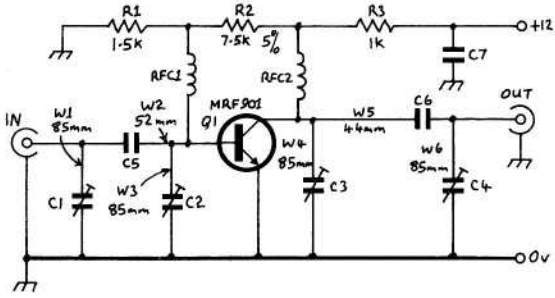


Fig.1 Diagram of a 1296MHz amplifier. If the dimensions shown for W1 - W6 are followed closely, excellent results should be obtained. All resistors are 1/3rd Watt.

C1-C4. 15pF
C5,6. 47pF ceramic. (zero lead lengths to be used).
C7. 0.01 disc ceramic.
Q1. MRF901
RFC1,2. 10 turns 30AWG enam. copper 1/8" dia. close wound.

This unit works very well at 1296 MHz and, if the dimensions given are duplicated, similar results should be obtained.

The "triple -threat" oscillator shown in Fig.2 will function as an ordinary oscillator, as a crystal injection-locked oscillator and as a super-regenerative detector. In order to build a receiver, one must have a local oscillator and its output should be clean. Bipolar devices often produce parametric parasitic frequencies and noise, and our first conventionally developed circuits were no exception. Therefore, the circuit shown was designed. This circuit uses a minimum of high-cost devices and eliminates items like chip capacitors. A bias network similar to that of the amplifier prevents accidental burn-out.

The "tricks" involved here are making the lead lengths as short as possible on the RF side of the circuit. Wrap W1 on a 3/8-inch (9 mm) former and adjust the diameter so that it reaches from the collector to within 1/8-inch (3 mm) of the base of Q1. (Always pre-tin the component leads and use as little heat as possible when soldering.) Do the same for the base lead, W2, and position it inside the collector lead. Glue down the collector lead using only "instant" glue. (Please note that only cyanoacrylic glues should be used to prevent detuning or loss of Q). For maximum output, push the base lead tightly against the collector lead and do the same for the output lead, W3; then glue them down. (W3 is simply a wire line run to the output connector at the edge of the board.) If a signal with very low harmonic content is required, the base lead, W2, may be spaced away from the collector lead until the oscillator almost stops.

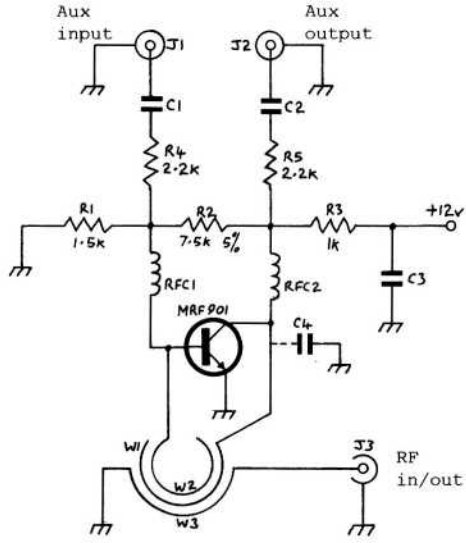


Fig.2 The "triple-threat" oscillator. Description and arrangement of the lines (W1-W3) and the tuning procedure are discussed in the text. All resistors are 1/3rd Watt.

C1-3	0.01 100v	W1	47mm No.14 wire (see text)
C4	Gimmic capacitor made from a 6BA screw threaded into the board near W1.	W2	37mm No.14 wire (see text)
		W3	See text
RFC1	10 turns 30AWG enam copper 1/8" dia.		
RFC2	10 turns 30AWG enam copper 1/4" dia.		

The oscillator range has not been tested fully, but we have built some that work from 1 GHz to 2.5 GHz. By feeding a 100 KHz sine wave into the auxiliary input, and placing a 3 KHz low pass filter and an audio amplifier at the auxiliary output, it becomes a super-regenerative detector. We have been able to receive signals at levels as low as -90 dBm with no problem. Like all super-regenerative receivers, this one may cause RFI and is recommended only for short-term experimental operation.

In building equipment using this wire line technique, it is quite permissible to bend or fold the wires forming the striplines. Do not, however, fold them too tightly, 'S' or 'U' shapes are as good as any.

COMBINED CIRCUITS

The RF amplifier, mixer and oscillator might be combined into a down-converter. If a more stable down-converter is desired, it is possible to crystal lock the oscillator by injecting a 100-MHz-range signal into the auxiliary input. The oscillator must then be tuned for lock. This is evident only when using more sophisticated observation methods such as noticing if the received signals are stable when the frequency trim screw is moved slightly.

We hope that the methods described here will provide a solid starting place for amateurs interested in microwave experimentation and activities.

This article is reprinted from QST magazine for July 1981 by kind permission of Laird Campbell, W1CUT, Managing Editor of QST for the ARRL.

TV ON THE AIR

By Andy Emmerson G8PTH

No shortage of mail again, so here's your activity-packed On the Air column. I have now moved, so please address letters to the new address given at the foot of this piece. No, I haven't got any aerials up yet, but that should follow soon.

Seems like we had some pretty good trops this summer. John G8UWS in Folkestone Kent had a field day with some Belgians on 14th July, working Harry ON1AHT, Gerd ON1AGC, Jean-Paul ON6PD and Jean-Marie ON7ZR. RX only were ON7CI in central Brussels and Georges F6GOZ.

The name of Roger Bunney is well known in DX-TV circles, but Roger is into ATV as well. He uses a domestic UHF TV aerial at 58 ft. AGL, with plenty of low-noise preamplification and a modified Teleng bandpass filter (to cut out group A brodcast QRM) to a Fortop converter. Good DX has been F6AGY (Blois, 325 miles) with P3 pix on 16th January and F1EDM (Bordeaux St. Clair, 25 km from Le Havre) P5 on the same day. Roger hopes to be transmitting from his Romsey location with a Fortop unit later this year. Activity in the Southampton area is high, thanks to a transmitter the Southampton club loans out. Roger also mentions a scout demo station some time ago which operated for half the contest day of June 18th with no callsign and no 144.750 talkback. Demos are no excuse for inconsiderate operation; as it was, it largely wiped out Roger's chances.

Norrie Macdonald GM4BVU and three friends enjoyed the Leicester exhibition, taking back a record of it on video to transmit later to less fortunates in central Scotland who could not make the trip. 1900 hrs GMT on Monday is the local activity period up there; stations to find include GM6AOR (George, Longridge), GM6JUV (Bill, Motherwell), GM6UFJ (Andy, East Kilbride) and of course Norrie in Hamilton. Norrie recently went portable 2000 ft. above Peebles and succeeded in working 40 miles to George, GM3RVK in Kennaway, Fife with P5 pix. Norrie adds a final note: his appeal for tape swaps in CQ-TV 122 got a better response from USATV Society members than the BATC! Come on guys - what are you up to?!

Jack G8ZWM in Crawley has become G4TVC! He writes that activity in his neck of the Sussex woods is almost nightly with Andy G6LMU, Bob G6LVN, John G4SFP, Mick G6IPP, Mick G6COQ. Also Doug and Dave G3HYV & G4PFX in Horley, and an operator known as 'Pirate Pete' (BATC member and twice failed RAE!).

The Home Counties ATV Group (G6HCT) went /P for its July meeting to a spot known as Old Redding near Harrow Weald. Pix were exchanged with several locals, also Mike G8LES/P in Petersfield, Hants., which sounds like a good haul to me.

Moving up the spectrum to the growth band, we have more news from Jack G4TVC. He has built an experimental 24 cm TX and has had some duplex QSOs. It is due for a rebuild now as soon as time can be found. Still in Sussex, the Worthing repeater mob put on a 24 cm demo for the Brighton rally this year. John G6MPE provided a signal for reception at the Racecourse site from his home not far away. John has also had success working France: F1EDM was worked as a two-way with just 2 watts on 1255 MHz. On the 17th August John worked Georges F3LP in Le Havre; Martin G8KOE had a two-way as well and Roy G6AIW saw them all P5. G6MPE and G8KOE are on the air almost every night with sound and colour vision over a 6 km path on 1255. Pix are better than on 70!

John uses a 24 cm Tonna, while Martin has a similar homebrew device wth one extra element. John's transmitter is to a KOE design, using a RadCom microwave drive source FM modulated, then to a varactor and interdigital filter to the VHF Handbook design (in CQ-TV 120). The filters were made by Roy, who also made some for the GB3WX repeater. They are silver plated and perform well. Martin's TX is the Wood & Douglas FM oscillator (latest design): this too performs well. Output is to a MHW-710 'blue brick' and varactor tripler, producing 2 or 3 watts on 1255. Both stations employ the CQ-TV 122 design RX. Roy speaks for all the Worthing area stations when he says 'I am really chuffed with 1255. I think more people ought to have a go. RX can be critical but you get good results with just a few watts'.

Garry G4CRJ called in at the Woburn rally to tell us about 24 cm activity in the London area. Apart from the stations mentioned last time, there are Mike G8LES in Thames Ditton (TX/RX) and Gary 550 ft ASL in High Wycombe (currently RX only). He sees Mike P2 with no preamp, the path being 15 km. Garry is planning a transmitter, possibly a power oscillator and phase-locked loop at 24 cm. Although it is no special problem, radar interference from Heathrow is quite strong at two spots in the band, white spots appearing on the screen even with no aerial!

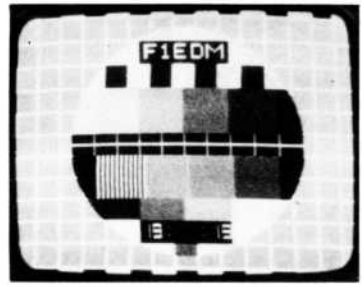
By the way, I have had to drop the 24 cm activity map for want of space. A SAE to me will get you a copy of the latest printout of stations on the air.

Not much SSTV news this time, just Jack G4TVC (he gets three mentions this time!). He explains all the morse bashing was to get his SSTV gear on HF. Hectic activity has resulted in contacts with VK3DUJ and VK6ES in Australia; he cannot find any SSTVers in New Zealand. He adds that suitable filters for SSTV are Kodak Wratten nos. 25, 47B and 58. These are £3.43 each from Allphotos Ltd., Tarring Road, Worthing, Sussex.

Finally a note on our photos: a version of the BATC electronic testcard by F1EDM complete with a callsign inlay, it looks as if F1EDM has modified it a bit to look more like the PM5544!

The other pic is an off-screen photo of a computer-generated pattern. This

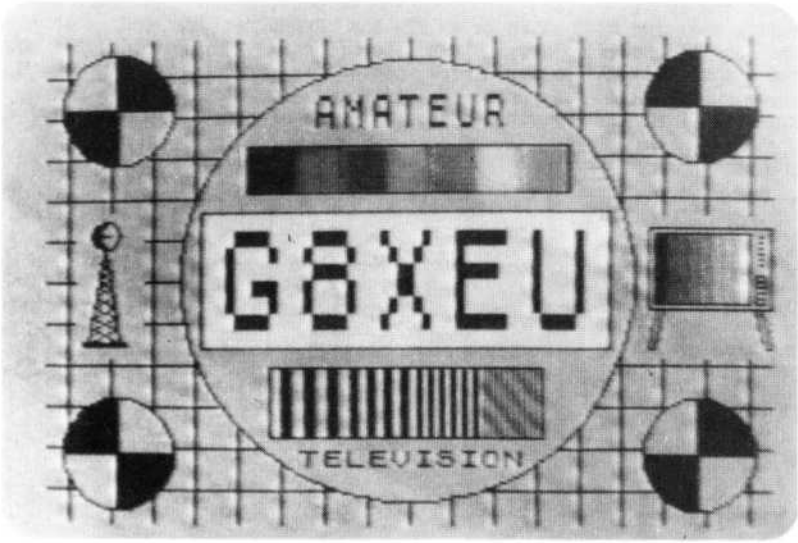
comes from a program for the Sinclair Spectrum computer written by Robin Stephens G8XEU. This program has the lot! It produces colour testcards, maps of the UK, contest serials and messages in all sizes of lettering down to one character per frame (for really difficult contacts). The tape will also produce colour bars and all manner of test patterns: it's amazing. Versions for the BBC and Dragon computers are also planned.



Thoroughly recommended and it is sold in aid of Worthing repeater group funds. It works on both RAM sizes, so send £5.50 to Robin Stephens today. His address is Toftwood, Mill Lane, High Salvington, Worthing, Sussex. Ask for details of other radio -orientated software for the Spectrum. While we're on the subject of recommendations I must mention Colin Edwards' test card generator published in July's 'Radio & Electronics World'. It's very good and I understand Colin will bring out a colour coder for it in due course.

(Editors note. A long letter from G6CEZ has been received too late for inclusion this time. Please try to let Andy have your leters by about ten days before closing date, (printed at the foot of each 'Contents' page).

That's it: there has been a lot this time, so apologies if I had to trim down your news. Let me have more for next time and send it to me at 71 Falcutt Way, Northampton, NN2 8PH. Many thanks - Andy Emmerson, G8PTH.



MONITOR CONVERSION

By J.Brown G8LPB

The old valve monitors have really had their day, and the writer is a long way from sources of second-hand monitors, even those that have appeared in 'CQ-TV' adverts. I obtained a little Sony portable 625-line set, a TV110K. This was re-tubed using a completely different CRT, and whilst this was being done thoughts turned to using it as a monitor as well. A few tests were carried out and the results were so good that it was thought it could be used by many who have similar portable sets around the shack. It should be pointed out that this only applies to TV's that are completely transistorised and that use a mains transformer - in many cases such sets also run off 12 volts d.c. Directly mains-driven types are out (see later safety note), but almost any of the 12 volt models are easily modified. The circuit of the Sony seemed straightforward, and the boards allowed pre-testing of the mod's before making them permanent.

TV110K MODIFICATION

The following notes apply specifically to the Sony TV110K, and the component references given are silk-screen printed onto the boards.

First remove the case and look for the board containing IF transformers etc. - the board could be marked 'BC', it is the only rectangular one in the set. Looking at the top (see Fig.1), locate L402 or Q401, around the top area in the middle and find R320 which is an 820-ohm carbon resistor and is in series with the base of the video driver transistor (see Fig.2). Unsolder the end of R320 nearest to R331 and solder a wire, preferably screened, to the board in the place where R320 was removed, earthing the braid to the nearby tag carrying a black earth wire. Now solder a second screened wire to the free

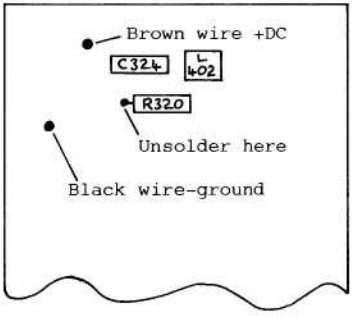


Fig.1 I.F.BOARD

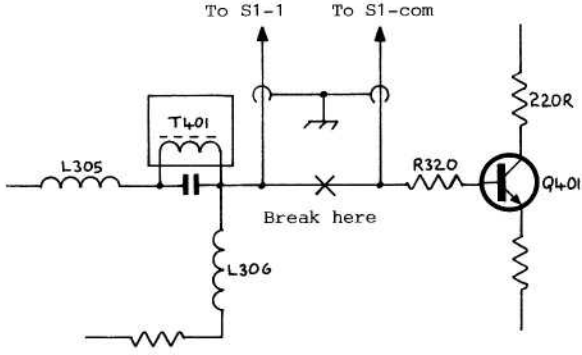


Fig.2 VIDEO DRIVER

end of the 820-ohm resistor and a red wire from the point where the brown wire connects (this is the d.c. positive supply), and also a black wire from the earth tag. The circuit (see Fig.3) is almost self-explanatory. A single-pole, 3-way miniature switch is needed, plus two input sockets; BNC or SO239 (UHF) would be ideal, although I used phono plugs and sockets. Three holes need to be drilled in the outer case of the set to accommodate the switch and sockets. Care is needed here to ensure clearance when the case is re-fitted; I positioned them in the top of the left-hand side (looking from the rear). They will easily fit there, out of the way of metalwork. The wiring is easily done; using all screened wire no IF breakthrough or Radio Frequency Interference has been experienced. Using a three-way switch for S1 means it is possible to select off-air signal, Video 1 or Video 2, without having to unplug any connection.

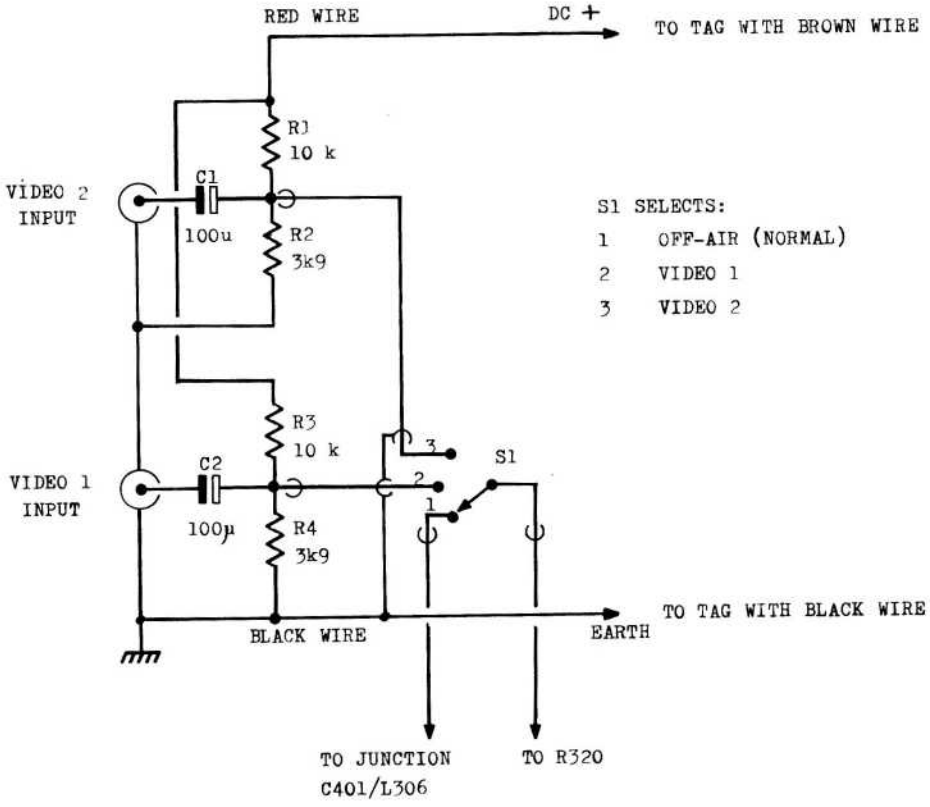


Fig.3 INPUT AND SWITCHING CIRCUITRY

The resulting monitor works very well, with excellent detail, and the contrast and brightness controls work normally. I have used it for RTTY and SSTV, especially for setting-up SSTV convertors. As yet the set has not been modified to cover 70cm, but it was felt that this could be easily done if required. However, with little or no fast-scan activity locally, this was left for a future occasion. It is likely many other similar sets could be utilised in the same way, and I hope these notes may encourage others to experiment.

SAFETY NOTE

No attempt should be made to modify TV receivers of the type connected directly to the mains supply (live chassis) unless a suitable isolating transformer is fitted.

FURTHER NOTES by A.P.Marsden.

Many other sets may be suitable for modification, and although not cheap, the following colour TV's have given particularly good results:

Sony 'Trinitron' models KV1810 and KV2000 (these need a transformer).
Thorn TX-10 (already mains isolated).
Thorn TX-9 (these need a transformer).
Some recent Mitsubishi models also use a mains transformer, and so may possibly be suitable.

For further reading on the subject, the following articles may be of interest:

'CQ-TV 90' Mod's to the Sony TV9-90UB.
'CQ-TV 119' Thorn TX-9 video/audio conversion (PCB available).
'Television' March 1978, Video Adapted Receivers.
'Television' August 1979 Monitor Conversion Using IC's.
'Television' January 1980 General mod's. Steve Beeching.

THE 'BUSINESS END' OF F3YX's SHACK

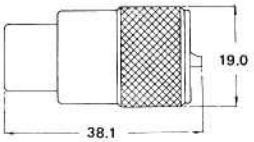
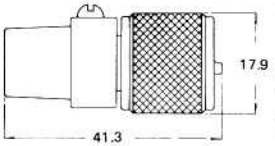
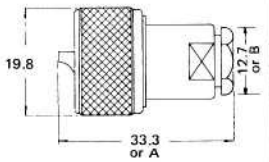
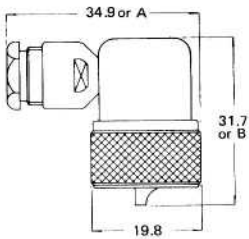
COAXIAL CONNECTORS

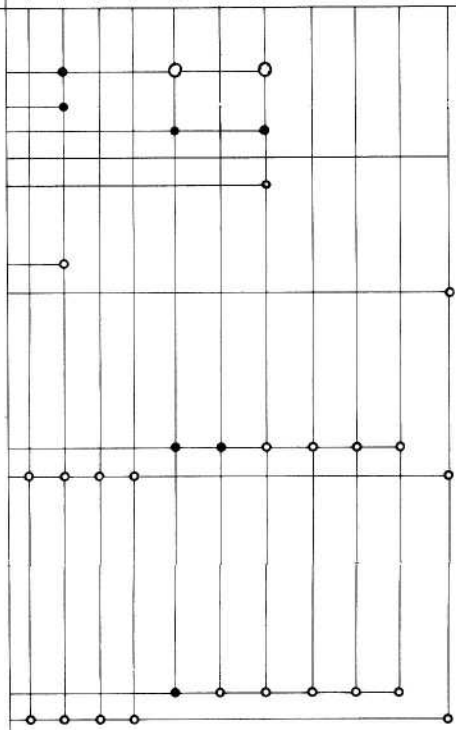
Series UHF

Series UHF are probably the most widely used connectors in amateur radio equipment. They are robustly designed for general purpose, low cost applications, and are suitable for a wide variety of small to medium size R.F. cables.

Impedance is not constant and there will consequently be a degree of voltage reflection. However, the series is generally satisfactory at frequencies up to 200MHz and, in certain applications, may be used up to 500MHz. Series UHF has a working voltage of 500v peak.

PLUGS

Connector outline	Dim. A	Dim. B	Assy. data	Greenpar No.	Cable clamp
PLUGS					
			1 or 2	40001[1]	–
				PL 259[1]	–
				PL 259/6[1]	–
			1	40054	–
			2	40046	–
			3	40002	–
			3	40007	–
	40.5	19.0	4	**40032**	C
			5	40040	C
ELBOW PLUGS					
			6	**40023**	C
	45.5	34.1	7	40047	C



NOTE 1. 40001 has p.t.f.e. insulation. Pl259 and PL259/6 are similar, but with low loss phenolic insulation.

As in previous articles, details are given only for those connectors commonly found in most radio shacks, other types are available details of which may be obtained from Greenpar stockists.

For general information and cable group details please refer to CQ-TV 122.

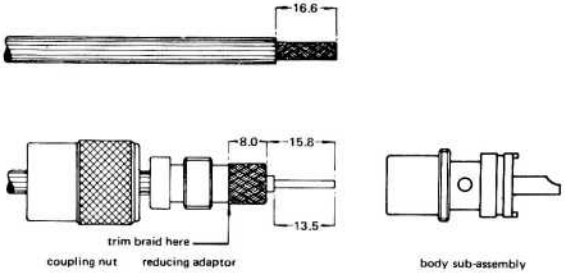
Our thanks to Greenpar Connectors Ltd for permission to publish this information.

Assembly instructions

Fig. 2. Plugs, MIL type PL259 with reducing adaptor

1. Place coupling nut, then reducing adaptor, over cable.
* 2. Trim outer sheath from cable to dimension shown.
3. Position reducing adaptor flush with end of outer sheath.
* 4. Fold back braid over reducing adaptor and trim as shown, checking that 15.8mm. dimension is achieved.
5. Trim dielectric as shown.
6. Tin exposed centre conductor.
7. Screw body sub-assembly tightly home against reducing adaptor boss.
8. Securely solder braid to body sub-assembly and conductor to contact.
9. Screw coupling nut forward over body sub-assembly.

1 * Where a reducing adaptor is not being used, trim the braid at the 15.8 dimension. The outer sheath should be trimmed back 27.0mm from the end.



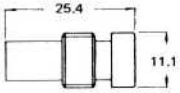
Connector outline	Assy. data Fig.	Greenpar No.	Cable groups
REDUCING ADAPTORS 		**40008** **40009**	accepts all cables in group 10 accepts all cables in groups 12 and 25 For use with GE 40001

Fig. 3. Plugs, MIL type PL259A

1. Place cone, then coupling nut, over cable, with threaded end of coupling nut towards free end of cable.
2. Trim from cable the outer sheath, braid and dielectric, to dimensions indicated.
3. Tin exposed braid and centre conductor.
4. Screw body sub-assembly onto cable, as far as is possible.
5. Solder braid to body sub-assembly, then centre conductor to contact.
6. Slide coupling nut onto body sub-assembly.
7. Position cone to retain coupling nut, but with clearance to allow rotation, and tighten screw.

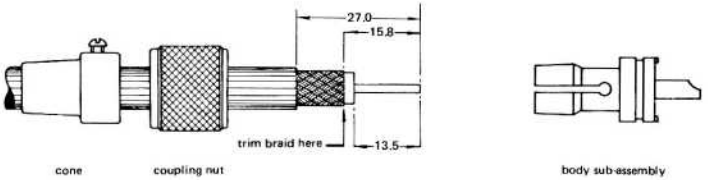
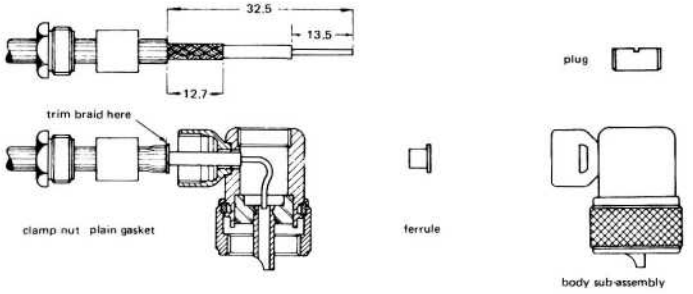
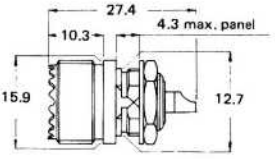
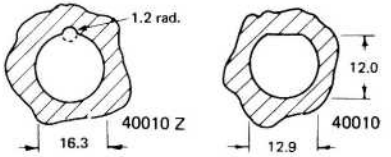
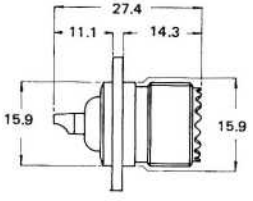
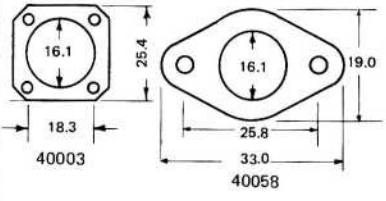


Fig. 6. Elbow plugs, pressure sleeve cable clamp

1. Place clamp nut, and plain gasket, over cable.
2. Trim cable outer sheath and braid to dimensions indicated.
3. Fold back braid, and insert ferrule between dielectric and braid, to trap braid between flange of ferrule and outer sheath.
4. Trim surplus braid as shown.
5. Trim dielectric to dimension shown.
6. Tin exposed centre conductor.
7. Press prepared cable end into body sub-assembly, via the cable entry, while feeding centre conductor into contact. Continue this operation until ferrule is seated inside body, and dielectric is butting against contact face.
8. Holding body sub-assembly and cable rigid, slide plain gasket and clamp nut into body sub-assembly and tighten clamp nut to retain cable.
9. Solder centre conductor to contact.
10. Insert plug into body sub-assembly and tighten.



BULKHEAD SOCKETS AND PANEL SOCKETS

Connector outline	Assy. data Fig.	Greenpar No.	MOUNTING DETAILS
BULKHEAD SOCKETS			
		**40010**	
PANEL SOCKETS		40010 Z	with insulating bushes.
		**40003**	**MOUNTING HOLES** 3.2 mm. dia. – **H** 4.7 mm. dia. – L
		40058	

*GE40003 has p.t.f.e. insulation; SO 239 is similar, but with low loss phenolic insulation.

PRINTED CIRCUITS EXPLAINED

By Chris Lewis G6ACL

A printed circuit board gives any project a more professional appearance than, for instance, Vero or tag board, also RF circuits requiring large areas of copper for distributed capacitive earthing are only possible with printed circuit boards.

Printed circuit material can be purchased as either single or double-sided copper-clad board in various thicknesses of both board and copper and in fibreglass, epoxy or paper resin bonded bases. The advantage of using fibreglass or epoxy boards over paper based ones, apart from reduced circuit losses particularly at VHF, is that fibreglass is easier to work with being less susceptible to cracking and chipping. These materials however are somewhat more expensive and really require those pricey tungsten drills since the ordinary ones do lose their edge rather quickly, they can of course be sharpened with a fine stone using a magnifying glass!

PRODUCTION METHOD

Remove all grease and finger marks from the PC board using wire wool and, working from a pre-drawn layout diagram, cover the areas which are to remain as copper 'lands' to prevent the etching solution from removing the pattern. There are three main methods of tracing the print pattern; the first is to use etch-resist transfers, these may be purchased in all the various shapes required and are transferred onto the PC board rather like Letraset lettering. A 'Dalo' etch resist pen is also available which is perhaps the easiest method to start off with. This pen is rather like the normal fibre tipped ones so widely used except that it contains a special ink which dries hard and is resistive to etching fluid. The Dalo pen however tends to have rather a thick tip therefore the drawing of thin tracks (through IC pins etc.) is rather difficult. Alternatively the pattern can be painted directly onto the board using most non water-based paints and a very fine sable artists brush. One of the best types of paint is cellulose used for touching up car paintwork (not aerosol - you can't dip your brush into it!). This method does require a rather steady hand but the use of cellulose paint ensures that work done two or three minutes earlier is dry thereby lessening the risk of smudging with your hand. Nail varnish is quite widely used for painting over large areas of copper.

Before etching the board check it over thoroughly - mistakes cannot be easily rectified. The board should be clean and free from finger marks etc. and any transfers should be firmly pressed down.
The finished board should be etched using the very corrosive chemical; ferric chloride. Extreme care should be taken in mixing the powder to produce a solution and during the etching process. Remember, ferric chloride is an acid. The fundemental rule when mixing such substances should be observed:

"Always do what you aught'a
add the acid to the water"

NEVER add water to acid.

It is best to carry out the etching process in a well ventilated room since the fumes given off are not very pleasant.

Use plastic or glass photographic developing trays for the etching bath, such vessels should thereafter only be used for this purpose. Ferric chloride solution becomes less active as it becomes saturated with copper, therefore the solution should only be used a few times or, if a lot of copper has been removed from a board, only perhaps two or three times. The etching process can be accelerated by warming the ferric chloride, a suitable method is to put a couple of inches of hot water into a plastic bowl and float the etching bath on the water. The heat will be transferred to the ferric chloride but it will not become too hot. Constant agitation of the bath during etching is particularly benificial. As a guide; etching can take typically between 5 and 15 minutes depending on the strength of the solution. When etching is complete the board should be rinsed thoroughly under the tap and the paint or transfers removed. Domestic paint strippers available in all D-I-Y shops remove most resist materials.

MASS-PRODUCTION

If a number of identical boards are required the print pattern must first be drawn onto a transparent plastic sheet providing a 'master' copy, this can then be used to produce as many boards as required. Transfers for producing original artwork are readily available and these are stuck onto the top of the

plastic sheet. Since the sheet is transparent it is worthwhile drawing your artwork out on a piece of graph paper exactly as you wish it to be on the finished board. The plastic sheet can then be placed over it and the pattern traced very acurately. Do remember that you are viewing the board from the underside (print side) therefore pay particular attention to pin-out diagrams for transistors and IC's.

Pre-sensitized printed circuit board - either single or double sided - is available from the stockists of etch-resist transfers. It is possible to purchase aerosol cans of the special lacquer to enable you to spray your own but, in practice, results using this method are seldom as flawless as the ready coated material.

To expose the board; remove the black plastic protective film (in a subdued light) and place it face-up on a table. Position the master artwork in the correct position on top of the board and keep it firmly in contact by using a piece of clean plate glass as a pressure plate. Expose the assembly to ultra-violet light for between five and ten minutes using either a special UV light box or a UV health lamp placed about twelve to eighteen inches away. Never look at the UV tube whilst it is in operation nor the reflection from the glass plate. It is best to use protective dark glasses.

After exposure the board should be developed in a solution of sodium hydroxide (or caustic soda) according to the instructions supplied with the chemical (also available with the other materials). Develop the board (still in a subdued light) until all the unwanted emulsion has washed away leaving a clear print of the PC tracks on a shiny copper background. Rinse the board thoroughly and dry. Any imperfections may be touched-in using paint or a Dalo pen. Etch the board as previously described.

Some stationers can photo-copy PC layouts directly from the page of a magazine onto transparent film. This service is normally intended for artwork used with overhead projectors as used in schools and colleges. The result may not be as uniformly dense as you require but can usually be re-touched with Indian ink.

Printed boards produced in this way have areas of bare copper on them which in a short space of time can corrode quite badly, this is not a good thing to let happen so a protective covering should be applied: Plumbers flux may be smeared over the surface and, with the aid of a small amount of solder and a hot iron, the board may be tinned. This method is a little messy and a suitable alternative is to use a clear protective lacquer spray such as 'Electrolube'. This not only protects the copper and prevents corrosion but also acts as a soldering flux as well.

MATERIALS described in this article may be obtained from (among others):

Cricklewood Electronics Ltd., 40 Cricklewood Broadway, London NW2 3ET.
Watford Electronics. 34/35 Cardiff Road, Watford, Herts.
Ambit International. 200 North Service Road, Brentwood, Essex CM14 4SG.
Maplin Electronic Supplies Ltd., P.O.Box 3, Rayleigh, Essex SS6 8LR.
R.S.Components Ltd. (Trade only).

CONTEST NEWS

BATC "SUMMERFUN" CONTEST

Those who took part in this contest will remember that instead of the usual 4 figure code groups, they were required to pass on either their own postcode for the first contact or the postcode received from their previous contact! As can be imagined, this caused some confusions, but although one station resorted to national grid references! most of the codes were passed around the system with remarkable accuracy.

Opinions concerning the use of postcodes were almost equally divided between those who thought it was a good idea and those who thought it washorrible. Those without computer generated graphics said that the contest was obviously designed for those who did have such devices and those who did, complained that the format of the postcodes did not suit their particular machine !

As well as the activity detailed above, G8MLA/P managed two 6 kilometre QSO's on 23cms and G6CAQ two one-way contacts including one with G6WOR/P at 74kms.

G8GON who went portable at Haytor on Dartmoor in Devon also had two short range QSO's on 10GHZ.

Still everyone obviously enjoyed the good weather which somewhat surprisingly, was not matched by anything approaching a life in conditions.

Check logs from G6RHL and G6LKQ are acknowledged with thanks.

These notes are being written in the "aftermath" of the International Contest (apologies for the incorrect dates shown inthe rules this year) and most stations appear to have enjoyed this event which was marred only by the very flat conditions and the driving rain !

Results in the next issue.

73's
GRAHAM SHIRVILLE 3VZV

BATC "SUMMERFUN" CONTEST RESULTS

POS	CALL	POINTS	QTH	BEST DX	QSO'S
1.	G8DTQ	3734	ZL60E	G8BWC - 214K	29
2.	G8DIR/P	3624	YM48F	G8DDC/P - 149K	25
3.	G6WOR/P	2885	ZK09F	GJ8KNV - 224K	24
4.	G8MLA/P	2768	ZM54J	G8XPZ - 182K	22
5.	G8CMQ/P	2696	AL44E	G6FPU - 109K	21
6.	G8DDC/P	2687	ZL18H	G8DIR/P - 149K	21
7.	G6CAQ	2634	ZL39G	G8GLQ - 152K	27
8.	G8MCQ/P	1994	YK30E	G8DTQ - 158K	16
9.	G6FPU	1602	ZM51B	G8CMQ/P - 120K	17
10.	G8MNY	1515	ZL60A	G6IKQ - 121K	18
11.	G4EUF/P	1386	ZM24J	G8DCC/P - 105K	14
12.	G3UMF	1153	ZL15F	G8DIR/P - 118K	9
13.	G8LKW/P	1108	ZM50D	G8DDC/P - 117K	10
14.	G6LRC/P	1089	ZL07A	G8LKW/P - 104K	10
15.	GW4TEE	1055	YN65C	G4ICV - 105K	10
16.	G4CRJ	1047	ZL38B	G6WOR/P - 78K	17
17.	G8GON/P	875	YK32H	G8MCQ/P - 157K	5
18.	G6CZE	713	ZM57J	G8MNY - 120K	6
19.	G8GLQ	680	YL48H	G8DIR/P - 102K	10
20.	G4BVK	547	YL48G	G8DIR/P - 105K	8
21.	G4BVU/P	413	ZL13B	G8DTQ - 112K	5
22.	G8VPG	174	YL48C	G3TBF/P - 40K	6
23.	G8ZQF	174	YL38F	G3TBF/P - 46K	7

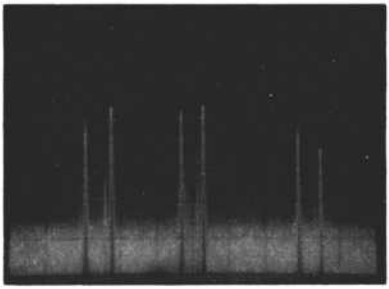
BATC 1983 WINTER ACTIVITY CONTEST

Members are reminded of the Winter Activity Contest which takes place on the 8th, 16th and 24th of November and the 2nd and 10th of December. This cumulative contest is held between 20.00 and 23.00 GMT on each of these dates.

The full rules were published in the last issue of CQ-TV (page 32) but a brief summary of them are given here.

A separate log should be entered for each band operated. Points score per Kilometre; 1 point/km - 70cm, 4 points/km - 24cm, 8 points/km - 3cm, these are for one-way contacts, for two-way exchanges the points total should be doubled.

The usual 4-figure code group is to be exchanged in video only and should be a different number for each leg of the contest. A maximum of three sessions only will count for points.



A BUDGET SPECTRUM ANALYSER

By John Wood G3YQC

In any ATV shack some form of spectrum analyser would assist greatly not only in checking for harmonic levels and spurious outputs from transmitters, but also as an aid to locating signals and aligning receive converters.

How many times have you heard stations on the air trying to set up a new ATV converter? At the outset one often has little idea where 70 or 24cm appears in the UHF band. With a spectrum analyser you can sweep all or part of the UHF TV spectrum thus enabling any signal to be instantly seen on the screen.

PRINCIPLE

The idea of this unit is to sweep the UHF TV band by employing a conventional varicap TV tuner whose tuning is controlled by a sweep signal (ramp) from an oscilloscope. The tuner IF signal is demodulated in a TV IF panel and the resulting signal displayed on the 'scope screen.

The first essential requirement is an oscilloscope with external X (horizontal) sweep input and output. The output level should idealy be around 0 - 30v, however, if a higher level is produced a series resistor 'R' should be included to limit the tuning voltage to a maximum of 33 volts. On some oscilloscopes the sweep output may be less than 30v in which case a suitable circuit may be provided to increase this to the required level.

More or less any varicap tuner may be used. Figs.1a and b show the connections for two of the more popular units. The frequency range may be extended by using a multi-band tuner such as an ELC2000 or ELC2060. These units cover bands I and III as well as UHF. Connections are shown in Fig.1c. The use of such a tuner makes the system very versatile.

Many surplus IF panels are suitable for this application however the Amateur TV Receiver on page 21 of the BATC Handbook (vol 1) should be particularly suitable. If this board is used the 100k tuning control is not required nor is the internal AGC system.

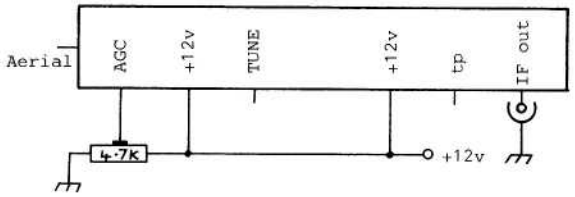


Fig.1a ELC1043

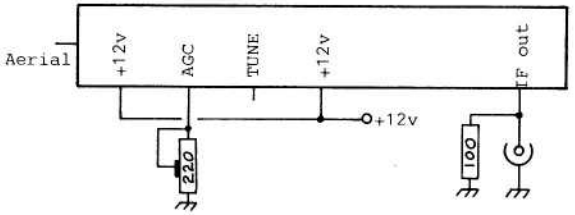


Fig.1b U321

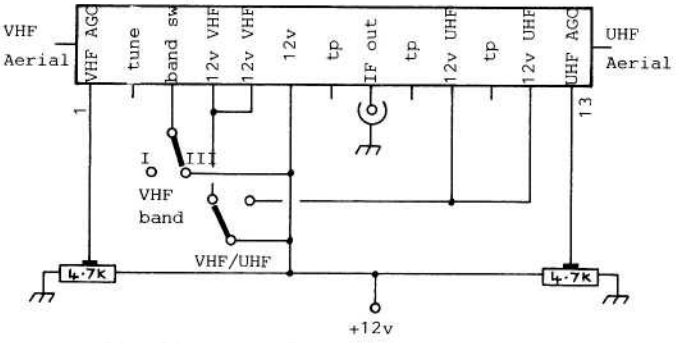


Fig.1c ELC2000/ ELC2060

Set AGC presets for maximum signal.

CIRCUIT DESCRIPTION

The circuit connection diagram is shown in Fig.2 and is fairly self-explanatory. The 1uF capacitor in the sweep output should be a non-electrolytic type. Resistor 'R' is selected to provide a maximum of 33v applied to the varicap tuner.

Controls are provided for sweep amplitude enabling any part of the band to be "zoomed" in to for a close-in examination of the signal and, 'Shift' to enable the signal to be positioned as desired across the face of the 'scope tube.

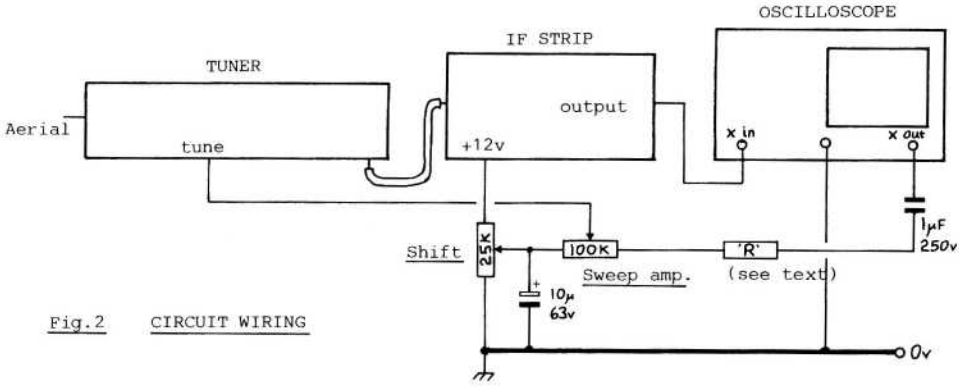


Fig.2 CIRCUIT WIRING

CONSTRUCTION

Layout is not critical: The tuner, resistors and potentiometers may be mounted on a piece of veroboard if required.

The 'scope output can be checked for adequate sweep by feeding "X out" into "Y in" with the sensitivity set at 10v/cm. You should see a diagonal line 3cm. high. Ensure that the sweep is not damped by the 100k sweep control. If the 'scope is unable to deliver the right X output, a 30v p-p 50Hz a.c. mains sweep may be used for both the tuner and the 'scope.

It may be useful to make a set of calibration charts to suit your particular system. This will assist in finding particular signals when the analyser is in use. The scale of the sweep is non-linear, stretched at channel 68 and cramped at channel 21. This is due to the non-linear nature of the tuner varicaps.

APPLICATIONS

Apart from the more obvious uses, the spectrum analyser may be used to monitor field strengths, variations in amplitude being easily seen. The signal output is approximately proportional to the signal input (provided no AGC system is employed) therefore calibration is linear. As a guide; a signal rising to the full height of the 'scope trace would represent a signal input of around 300uV. If stronger input signals are anticipated a suitable RF attenuator should be connected in front of the tuner.

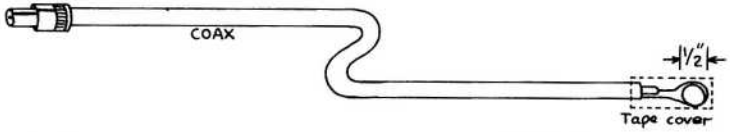


Fig.3 SEARCH PROBE FOR LOCATING INSTABILITY

Another useful application is for tracing parasitic oscillations. The method used here is to fit a search probe to the input. This probe consists of a length of coax cable with a plug at one end and a two-turn loop of stiff, insulated wire at the other (see Fig.3). This probe will seek out the source of oscillations with unerring accuracy. A single burst of UHF instability shows as a very tall thin spike at one point on the band with a smaller one at twice IF (image frequency) above it (Fig.4a). Harmonics of the detector produce spikes every 39.5MHz, seen on the 'scope as a combe-like trace - Fig.4b.

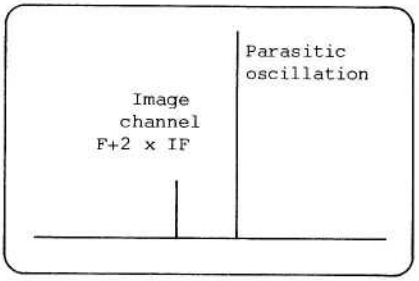


Fig.4a

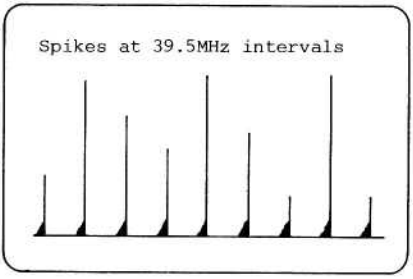


Fig.4b

PRINTED CIRCUIT boards for the BATC IF system are available from Members Services.

Coil details for this design are:-

L1	12t	26swg on 4mm former
L2	6t	" " "
L3	4t	" " "

All close-wound with core and can.

Various types of Varicap tuner as well as SAW filters are available from: Sendz Components. 63 Bishopsteignton, Shoeburyness, Essex SS3 8AF

References.

Varicap Tuner Panoramic Monitor by H.Peters.
Television Magazine, November 1971

An Amateur Television Receiver.
Amateur Television Handbook volume 1 (blue).

Items from these lists are available to club members only.
This list supercedes all previous ones.

QTY	PRINTED CIRCUIT BOARDS	EACH	P&P	TOTAL
	'Project 100' sync generator (CQ-TV100)	£3.00	0.30	
	TX-9 video/audio in/out (CQ-TV119)	£2.25	0.30	
	FM-TV demodulator (CQ-TV122)	£3.00	0.30	
	Wide-band 70cm ATV tuner (HB1)	£3.00	0.30	
	Amateur television receiver (HB1)	£1.50	0.30	
	Electronic character generator (HB1)	£3.00	0.30	
	Colour test card (set of 3-double-sided)	£15.00	0.60	
	Horizontal aperture corrector (HB1)	£3.00	0.30	
	PAL colour coder (HB1)	£3.00	0.30	
	Vision switcher matrix (HB2)	£4.00	0.30	
	Vision switcher logic (HB2)	£4.00	0.30	
	Vision mixer (HB2)	£4.00	0.30	
	70cm VSB transmitter-7 boards (HB2)	£15.00	0,40	
	SSTV pattern/sync generator (HB2)	£3.00	0.30	
	Character colourizer,(printed legends HB2)	£5.00	0.30	
	Piggy-back keyboard (HB2)	£2.25	0.20	
	70cm TV transmitter (TVA and CQ-TV122)	£3.00	0.30	
	ATV up-converter (TVA and CQ-TV112)	£2.25	0.30	
	Video filter (TVA and CQ-TV122)	£1.00	0.16	
	*HB1 & 2 = Handbooks.TVA = TV For Amateurs			
	SPG, greyscale, char gen (Ham Radio Today)	£4.set	0.60	
	SSTV to FSTV converter & reprint (Rad Com)	£10.set	0.60	
	STATIONERY,ACCESSORIES AND COMPONENTS			
	BATC test card - with data sheet	0.50	0.24	
	BATC reporting chart (illustrated)	0.12	0.20	
	BATC lapel badge - diamond - button hole	0.40	0.16	

_____	BATC lapel badge - round - pin fastening	0.50	0.16	_____
_____	BATC callsign* lapel badge-pin fastening *Write callsign CLEARLY. Sent by supplier	£1.50	nil	_____
_____	BATC key fob	0.60	0.16	_____
_____	BATC equipment stickers - 1" round	0.15	0.16	_____
_____	BATC windscreen stickers - 2.5" round	0.10	0.16	_____
_____	1" Vidicon scan-coils (low Z focus coils)	£6.00	£1.20	_____
_____	1" Vidicon scan-coils (high Z focus coils)	£6.00	£1.20	_____
_____	2/3" Vidicon scan-coils	£6.00	0.80	_____
_____	Vidicon bases - 1" or 2/3" (state which)	0.50	0.16	_____
_____	TV camera lens mounts - 'C' type	£1.00	0.24	_____
_____	13.14MHz TV TX crystal (Hbk 2)	£5.00	0,16	_____
_____	108MHz TV TX crystal (TV for Am)	£7.00	0.16	_____
_____	5MHz SPG crystal (P100)	£2.75	0.16	_____
_____	TBP28122 PROM. Pre-programmed for colour test card circle. (eqt.74S471)	£10.00	0.25	_____
_____	2732 EPROM. Slow-scan program	£12.00	0.16	_____
_____	4.433618MHz PAL colour subcarrier crystal	0.40	nil	_____
		TOTAL		_____
		POSTAGE		_____
		TOTAL ENCLOSED		_____

CAMERA TUBES & ORDERING INFORMATION

Members requiring EEV Leddicon, EMI 9777 Ebitron, 9728, 9706, 9677 (1" EMI) vidicons or 9831 (2/3" EMI) vidicon should enquire for the latest prices and delivery. ALL enquiries needing a reply should include a SAE or IRC. OVERSEAS MEMBERS should ask for a quotation of postage costs before ordering. PUBLICATIONS must be ordered separately from the Publications Department. CHEQUES are payable to "The BATC" and should be for English banks only please ORDERS TO:- Mr. P.Delaney. 6 East View Close, Wargrave, BERKS RG10 8BJ, England. Tel: 073 522 3121

BLOCK CAPITALS PLEASE

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PUBLICATIONS

QTY	PUBLICATION	EACH	P&P	
	AMATEUR TELEVISION HANDBOOK vol.1 by J.Wood G3YQC and T.Brown G8CJS	£1.50	0.40	
	AMATEUR TELEVISION HANDBOOK vol.2 by T.Brown G8CJS	£2.00	0.40	
	TV FOR AMATEURS by J.Wood G3YQC	£1.50	0.25	
	CQ-TV BACK ISSUES. The following issues are still available although stocks of some are low. Please circle those required.			
	68,88,89,90,91,92.....	0.25	*	
	93,94,95,96,99,100, 103,105,106,107, 111,117,118,119,120, 122,123... *Please estimate appropriate postage	0.50	*	
	RE-PRINTS. Photocopies of any article from past issues of CQ-TV are available. Payment (if ordered separately) in UK postage stamps please.	0.20 per sheet	0.20	
	INDEX. All main articles in past issues of CQ-TV and 4 Handbooks. Inc. page count, (essential for ordering re-prints).	£1.00	nil	

TOTAL £

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PLEASE DETACH HERE

AUSTRALIA

Would Australian members please note that the "AMATEUR TELEVISION HANDBOOK" Vol.1 is available direct from the Wireless Institute of Australia at: PO Box 150, Toorak, Victoria 3142. Please enquire for volume 2 and "TV FOR AMATEURS".

All other orders please to:- BATC PUBLICATIONS, 14 LILAC AVENUE, LEICESTER LE5 1FN.

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LOOK

A TV DAY-OUT

Q-STUDIOS, TOGETHER WITH THE BATC ARE TO ORGANISE A TV EXTRAVAGANZA AT THEIR TV STUDIOS IN QUENIBOROUGH, LEICESTER LATER IN THE YEAR.

THERE WILL BE SO MUCH TO SEE AND DO THAT YOU WON'T WANT TO MISS IT. AMONG THE TRADE STANDS WILL BE: Q-STUDIOS, WOOD & DOUGLAS, MICROWAVE MODULES, FORTOP, ANT PRODUCTS, PREMIER PATTERN MAKING Co. AND THE BATC. THERE WILL BE FACILITIES FOR MEMBERS TO BRING THEIR OWN EQUIPMENT FOR SALE.

THE DAYS ACTIVITIES WILL INCLUDE:

★ VIDEO STUDIO DEMONSTRATIONS ★ 24-TRACK SOUND RECORDING DEMONSTRATIONS

★ SHORT ENTERTAINMENT SHOWS (to demonstrate the above techniques)

★ A FULL LECTURE PROGRAMME ★ MEMBERS DISPLAYS ★ STATIC DISPLAYS

★ CLUB VIDEO SHOWS ★ ALL-DAY BAR ★ SNACK BAR

LUNCH WILL BE AVAILABLE NEARBY (A CHOICE OF TWO NICE PUBS) AND ALSO - FOR UP-MARKET MEMBERS - AT QUENIBOROUGH HALL HOTEL AT WHICH OVERNIGHT ACCOMODATION IS ALSO AVAILABLE AT VERY MODEST COST. 'PHONE LEICESTER (0533) 605751.

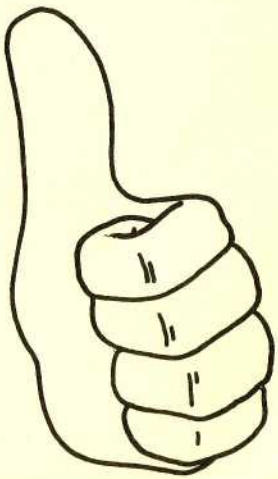
A TAXI SERVICE FROM LONDON ROAD RAILWAY STATION WILL BE AVAILABLE BY PRIOR ARRANGEMENT.

TALK-IN WILL BE ON 2m (S22) and 70cm (SU8).

ADMISSION FREE. DOORS OPEN 11am, CLOSING 4.30pm.

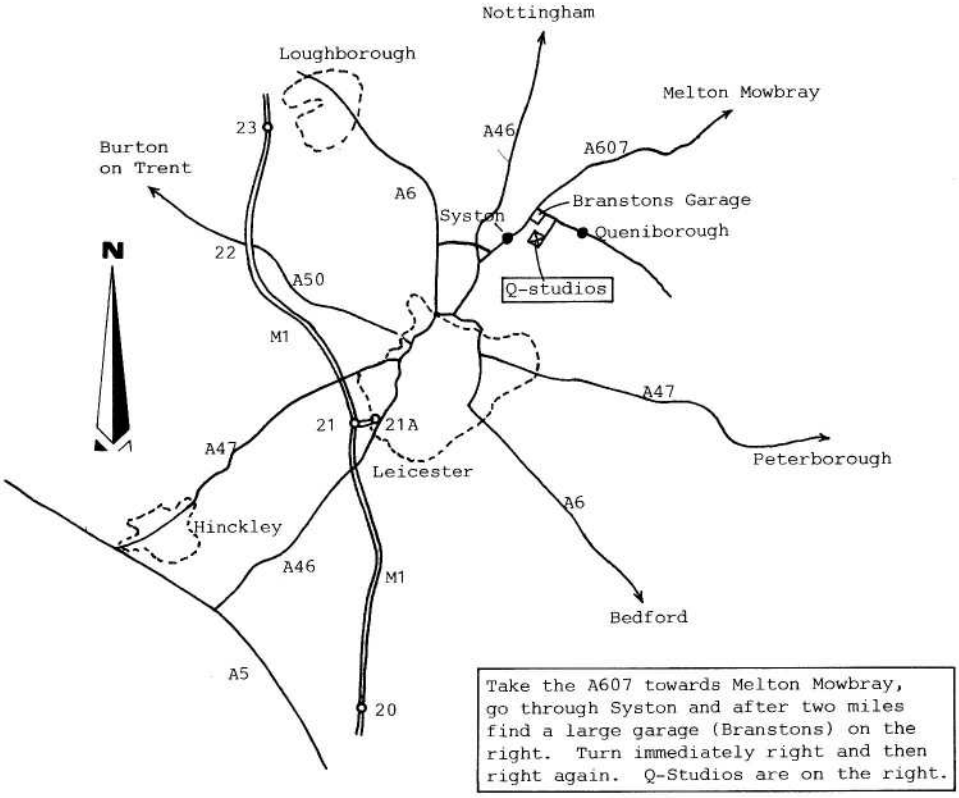
FOR FURTHER INFORMATION CONTACT PAUL ELLIOTT ON LEICESTER (0533) 553293 (day) or LEICESTER (0533) 606986 (evenings).

OK!



NOVEMBER 20th.

SEE YOU THERE



Lectures start at 11.30 and finish around 4.00pm.
Anyone who could give a talk or lecture is asked to contact Paul Elliott as soon as possible.

The Horse & Groom is the 'local' to head for for those requiring a good lunch.

Any further information is available by contacting Paul Elliott G4MQS at;

9 Merchants Common,
East Goscote,
Leicester

or 'phone:
(0533) 553293 during office hours or
(0533) 606986 evenings.

DON'T MISS IT

THE "BIG SYNC" MODULATOR

By Trevor Brown G8CJS

In 'Amateur Television Handbook' vol.1. there appeared a very simple video modulator which would impress video onto any transistor PA up to about 2 Watts. There were only two controls, 'Bias' and 'Video Gain'. This little modulator helped many people onto the video airwaves.

Fig.1 shows the typical transfer characteristic of a transistor PA. It has a section which is more or less linear, a small deviation from linearity ar the foot of the curve (a) and a large deviation from linearity at the top of the curve (b). The bias pot moves the DC position of the video and the gain pot sets the video amplitude; by careful adjustment of these controls the video can be set to accupy the linear portion of the PA's characteristic.

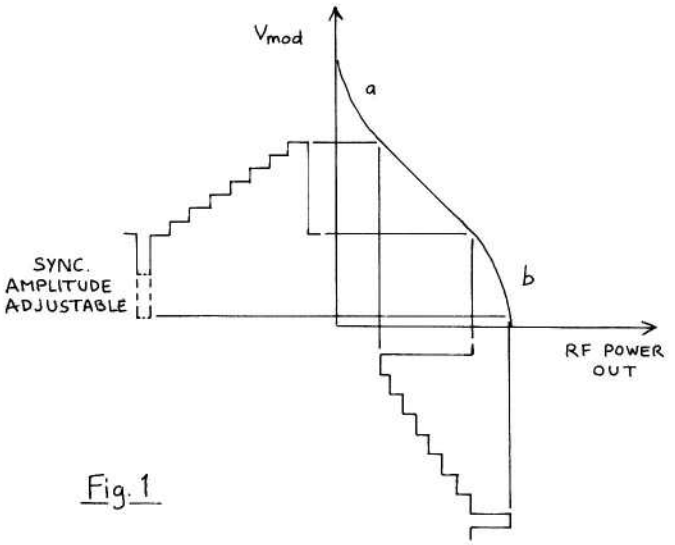


Fig.1

The bend at the top of the curve in Fig.1 cannot be used as it would result in severe sync crushing. This can be overcme to some extent by using a sync stretch amplifier in front of the modulator. This pre-distorts the video waveform before it enters the modulator but the distortion is cancelled out by the non linearity in the PA. This enables the PA to be driven harder and so produce more output.

This new modulator, shown in Fig.2 sets out to overcome these problems without any additional circuitry. The negative extremity of the sync pulse is clamped to a voltage approaching Vcc and the 1k pot is simply adjusted to increase the sync amplitude to the point where the video part of the signal reaches the linear portion of the characteristic. In this way, the non-linear part has been used for the sync pulses and the linear part for the video.

The 2SC1307 used to increase the modulation capability of this modulator is an 11metre PA transistor. Finding a transistor with suitable power gain together with suitable bandwidth can be a problem, but these new devices seem to fill the bill nicely. The 2SC1307 increases the power handling of the modulator so that modulation of 10 and 15W PA's such as the MHW-710 is possible.

The new circuit also has greater immunity to voltage supply variations because of the zener-stabilised clamp voltage, so readjustment as the car battery fails is not necessary! The circuitry has been deliberately kept as simple as possible to encourage experimentation. Sync stretch can often result in a power increase of up to about 40% over normal linear methods and as such is well worth investigation.

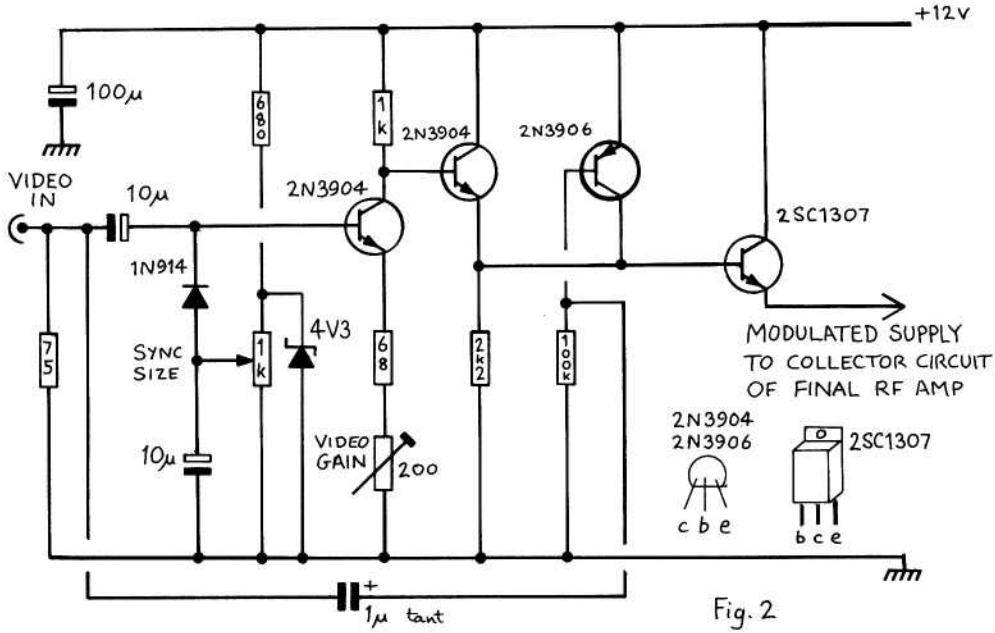


Fig. 2

QUALITY VIDEO FROM THE BBC MICRO

BY JOHN GOODE

The by now well-known excellence of the BBC Microcomputer's graphics, allied with its capability for mixing text and graphics anywhere on the screen, makes the prospect of using it as a vision source very attractive. However, just how good a vision source is it? Much has been written about the BBC Micro. software, but what about the hardware? Remember, the video outputs are designed as a source for monitors and domestic TVs, and not as a studio vision source. It is not possible to synchronise the micro's output to other vision sources or a station SPG, and so if mixing is required, the other sources will have to be locked to the micro.

I came to examine these problems because my boss (the Director of the TV unit where I work) was very keen on the idea of using the BBC micro to generate captions, animated diagrams, etc; to be included within the programmes we are asked to make. As the cost of a "proper" TV caption and graphics generator is at least ten times that of the BBC Model 'B', I thought the least I could do was to try genlocking our colour studio desk to our Model 'B'! There were problems, which I'll come to in due course; however, some of the difficulties we had in locking a semi-professional desk to the micro may not prove to be problems in an amateur station.

The problems encountered may be itemised as follows:-

(1) No composite colour video without modification.
(2) In-built PAL coder is of poor quality.
(3) Horizontal scanning (line) frequency is out of specification, and is not adjustable.
(4) Scanning (interlaced or non-interlaced) is not always predictable (except in Mode 7).

For amateur use items 2, 3 and 4 may not be of vital importance; however, for the best video output quality, read on!

(1) NO COMPOSITE COLOUR VIDEO OUT

Converting the BNC video output to colour was covered by the Editor in CQ-TV 121. However, rather than using a 56pF capacitor to link the chroma to the output, Acorn now recommend using a 470pF capacitor as this gives a higher level chroma signal.

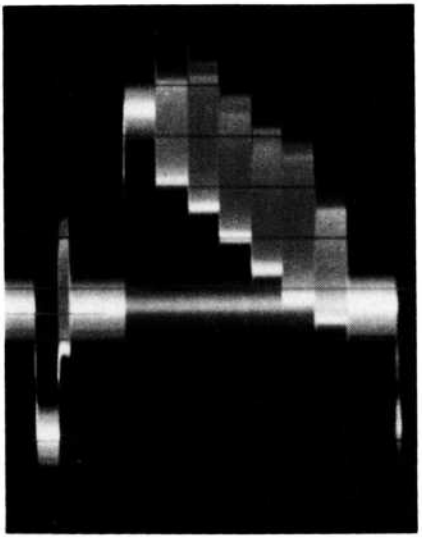


Fig.1a. Encoded video using built-in coder.

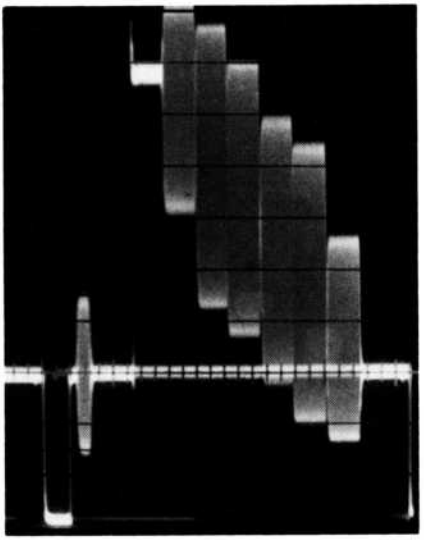


Fig.1b. Video output taken from an external coder.

(2) SHORTCOMINGS OF THE BUILT-IN CODER

Because the computer produces RGB outputs that are either "on" or "off", a simple form of PAL coder employing TTL ICs can be used. The circuit uses a 4 x fsc oscillator, counted down to 4.43 MHz by a TTL ring-counter. Although the stability of this oscillator is adequate for use with domestic TVs and monitors, it is not temperature stabilized, and drifts too much to act as a source for genlocking studio equipment. In addition, the signal has no burst-blanking; the burst itself occupies the whole of the back-porch period; and the chrominance has poor sine purity, having been crudely filtered after being processed as a TTL signal. This causes poor carrier balance, with spurious subcarrier and harmonics in non-coloured areas of the picture. See fig.1a.
From the above, it is obvious that for serious colour work, Acorn expect the R.G.B. Sync. output to be used. If this is fed to an external PAL coder (the Handbook Coder would do), with sync feed used to genlock the desk S.P.G, better results can be expected. See Fig.2.

By genlocking the SPG to the composite sync output (which has no burst, of course), the SPG follows the scanning of the micro's video, but the subcarrier remains unaffected by the micro. The external coder is therefore driven by a stable subcarrier and the pulses supplied to it from the genlocked SPG conform to normal television standards, having correct burst-blanking, equalizing pulses, etc, etc. This gives a good quality PAL output, even though the full sc-to-line frequency relationship is lost. This is not a problem provided that both sc and line frequencies are close to nominal - more of this in Section 3.

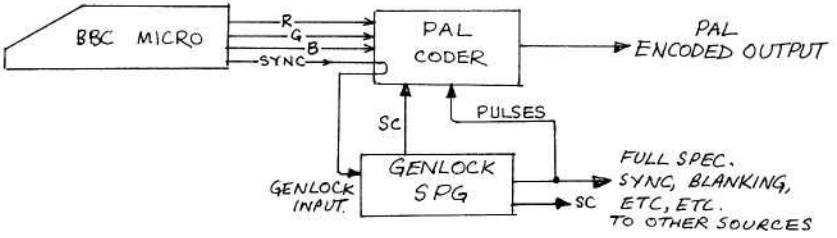


Fig.2a Suggested Arrangement - See Text.

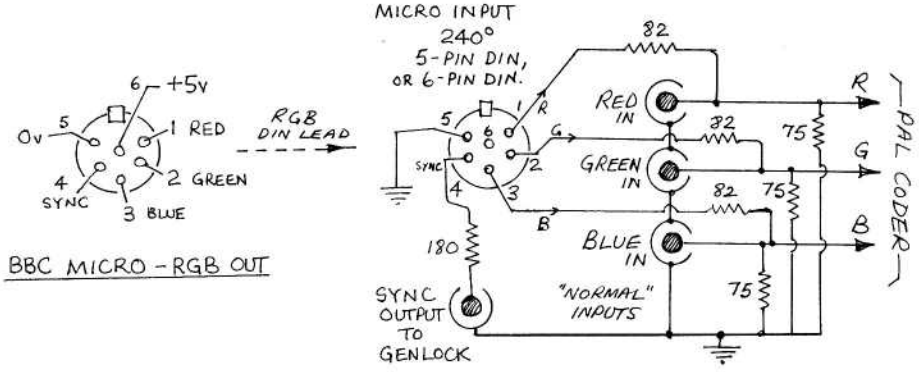


Fig.2b External PAL Coder Input Modifications.

(3) HORIZONTAL (line) FREQUENCY OUT OF SPECIFICATION

There were two problems caused by the line frequency being out of spec. These were: (i) cross-colour interference causing "crawl" on the luminance in coloured areas of the picture; (ii) the line frequency was outside the range of our colour cameras' genlock.

The easiest way to check the scanning frequency is to use a double-beam 'scope to compare the micro's output with a broadcast signal. Trigger the 'scope from the broadcast signal, and display 2 or 3 lines on the CRT (on Y1). The rate of drift of the micro's video (on Y2) will indicate how far out the frequency is. If the broadcast signal is taken to be correct (a reasonable assumption), the micro's scanning will be to CCIR spec. (+0.01%) if the rate of drift is less than 1.5 lines/second. The difficulty is that there is no means of adjusting the scanning frequency if it is outside tolerance, which it probably will be. See Figs.3.

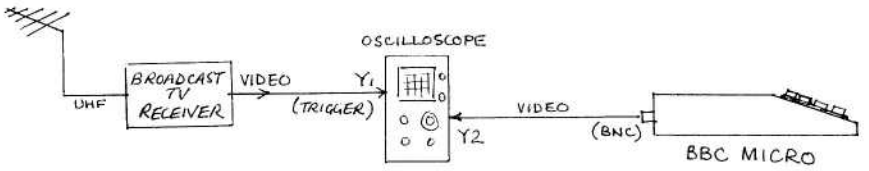


Fig.3a Setup for Checking Line Frequency.

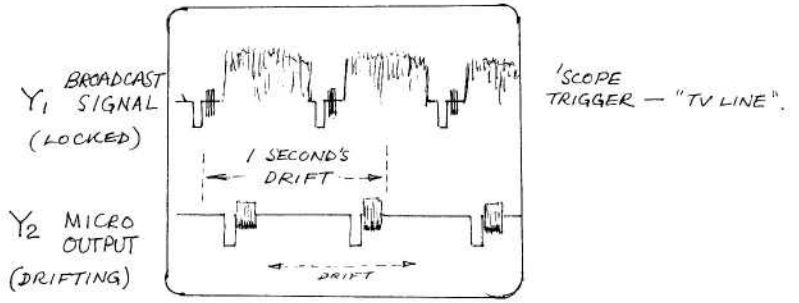


Fig.3b Oscilloscope Display.

The video scanning frequency is counted down from the 16 MHz master clock oscillator. This is a standard TTL crystal oscillator using a 74S04 (IC43), but unfortunately it is not provided with a trimmer capacitor. (The location of the ICs on the circuit board is shown in Fig.4.). The circuit of the clock oscillator is shown in Fig.5, which includes the required modification (a 30pF (or thereabouts) trimmer capacitor).

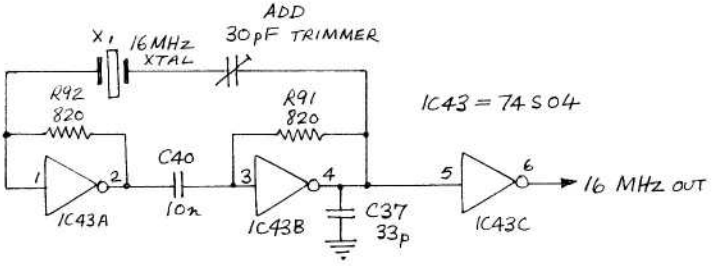


Fig.5 Modified Clock Oscillator Circuit - With Trimmer.

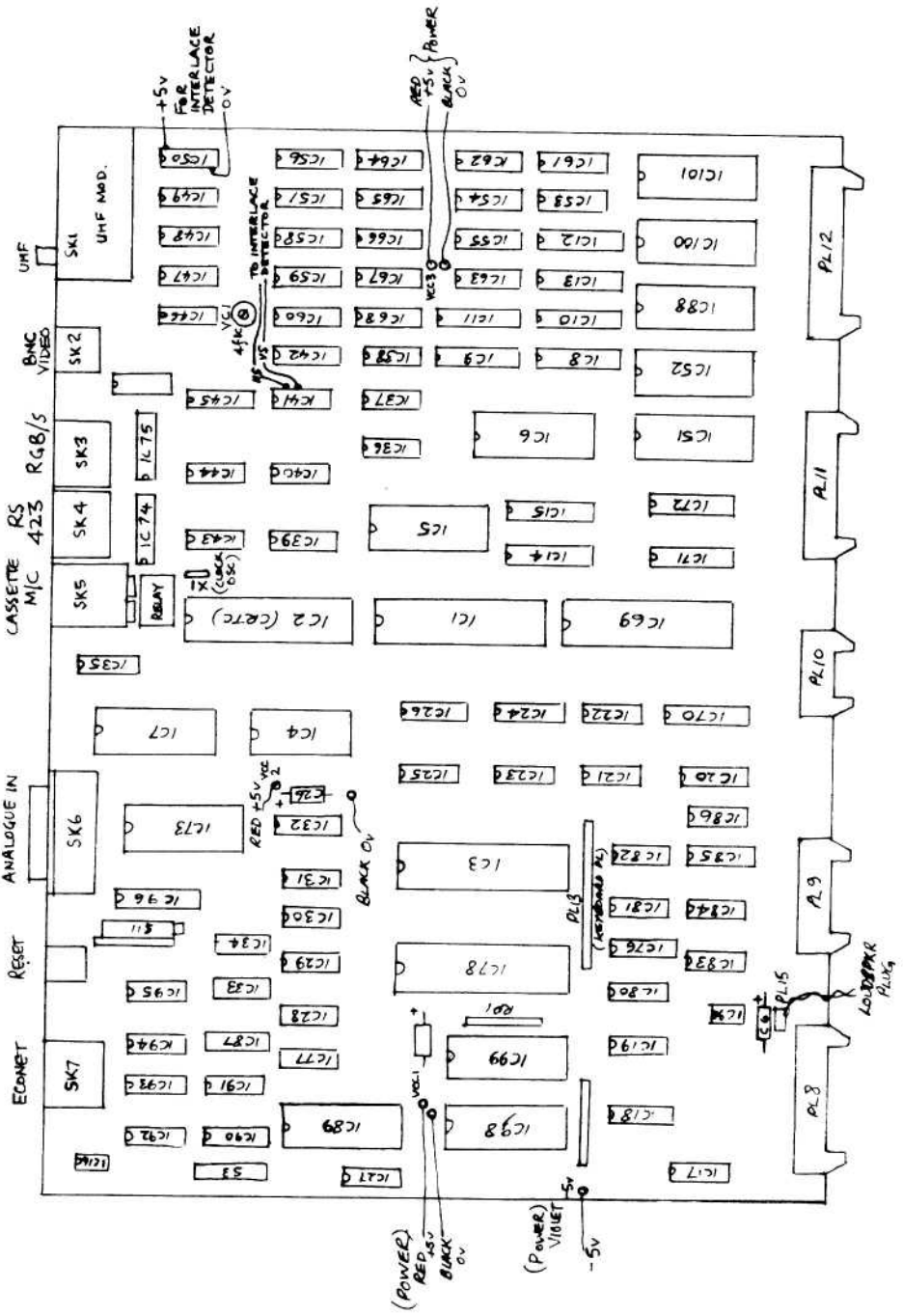


Fig.4 Main Board Integrated Circuit locations.

Finding space to mount the trimmer is a problem, as it has to be in series with the 16 MHz crystal. I decided to remove the crystal from the PCB, and then solder two 18 SWG tinned copper wire "legs" (sleeved) in the crystal mounting holes, mounting the crystal and trimmer on a small piece of veroboard on these "legs", piggyback over the adjacent components. See Fig.6.

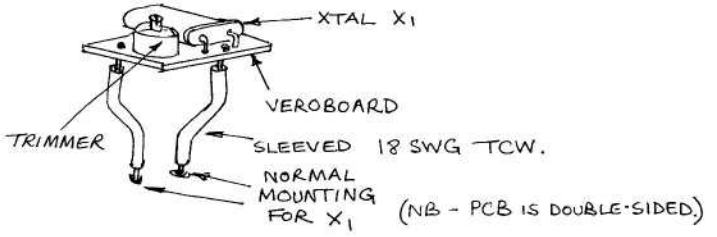


Fig.6 Mounting for Crystal and Trimmer Capacitor.

Once the trimmer is installed, the horizontal frequency can be set using the method described above. A rate of drift of less than 1.5 lines/second should be easy to obtain - carry out this adjustment after the micro has warmed-up, say 10 to 15 minutes after switch-on. Once this adjustment has been made, I found no problem in getting colour cameras to genlock to our micro.

When the problem of adjusting the horizontal frequency first came to light, I wrote to Acorn Computers to enquire if there was any way of altering the line frequency without resorting to a soldering iron. They said that there wasn't, although they suggested I could try reprogramming one of the registers in the 6845 CRT controller chip (IC2), and they very kindly sent me a copy of its data sheet. Now I am not a "Software Man", my acquaintance with microcomputers being fairly recent; but I did try using the command for reprogramming the horizontal scanning register of the 6845 (as Acorn suggested). As suspected, this only made the frequency further from spec. I therefore decided that modifying the clock oscillator was the only course open to me. Nevertheless, the data sheet on the 6845 proved to be of value when I was trying to sort out problem number 4!

(4) UNPREDICTABILITY OF INTERLACE

As stated in the previous section, I am a relative newcomer to microcomputers, and I am only just beginning to come to grips with software. As far as I can make out, with the BBC micro, the following seems to be true - (any readers who know better, please get in touch!)

(a) When switched on, the machine always goes into Mode 7 (Teletext Mode).
(b) In Mode 7, the scanning is always interlaced.
(c) In modes other than 7, the scanning can be either interlaced or sequential (non-interlaced).

(d) Condition (c), above, seems to be random; however, if at switch-on any mode is (say) interlaced, it will always be interlaced if the computer is not switched off.
(e) In modes other than 7, the scanning can always be changed by entering the command VDU 23,0,8,64,0,0,0,0,0,0 which appears to make the CRTC interlace register toggle.

For use in a TV studio, it is essential that the 2:1 interlaced scanning mode is employed, as the sequential mode upsets the servo mechanisms of editing VTRs, and it may cause miscounting in the genlock SPG. I therefore decided to add an "interlace detector" to the computer - operationally this consists of an L.E.D. that flashes when the video output is non-interlaced.

According to the 6845 data sheet, the two modes of scanning are as illustrated in Fig.8. Note that with sequential scanning the field sync pulse has the same relationship to the line syncs on EVERY field. This means that each field contains 312 lines (instead of 312.5), and so over two fields there are 624 lines (not 625), and this can upset the counters in some genlock SPGs.

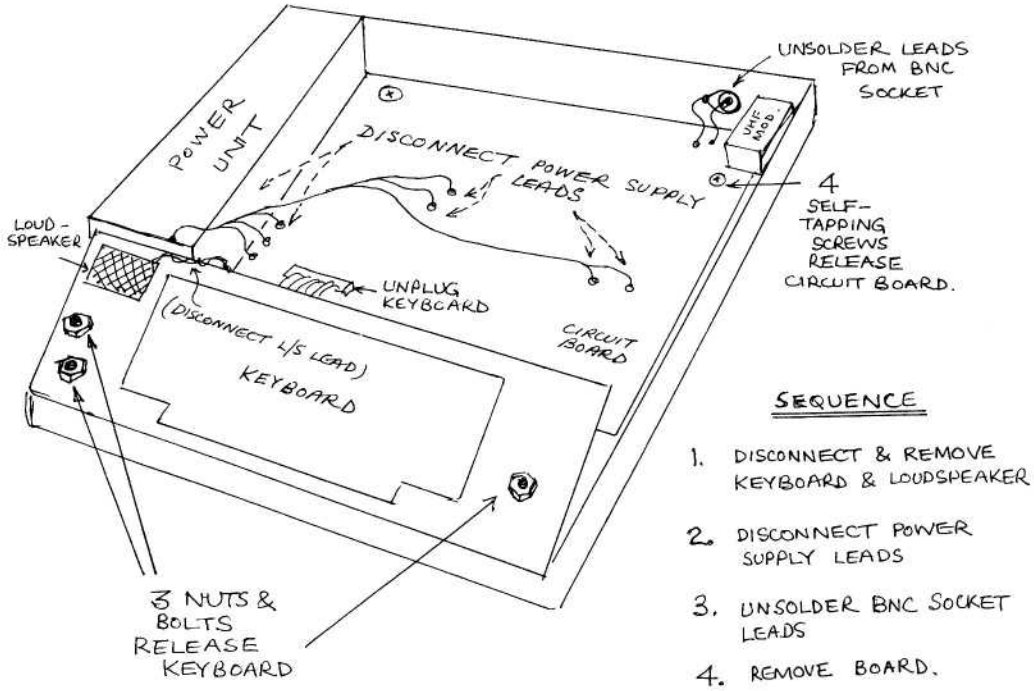


Fig.7 Removing the Circuit Board.

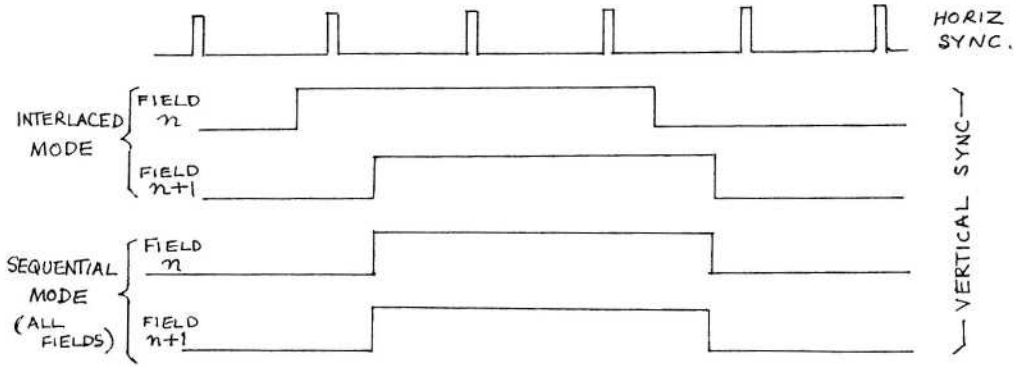


Fig.8 Scanning Modes.

Consider Fig.9. where I have shown the line sync train compared to a shortened (half-line) field sync. If the line and shortened field sync are gated together, in the interlaced mode there will be one output pulse every 2 fields (40mS), whilst in the sequential mode no output will be obtained. Using this information to drive a 45mS retriggerable monostable will enable a flashing LED to be illuminated when the signal is not interlaced.

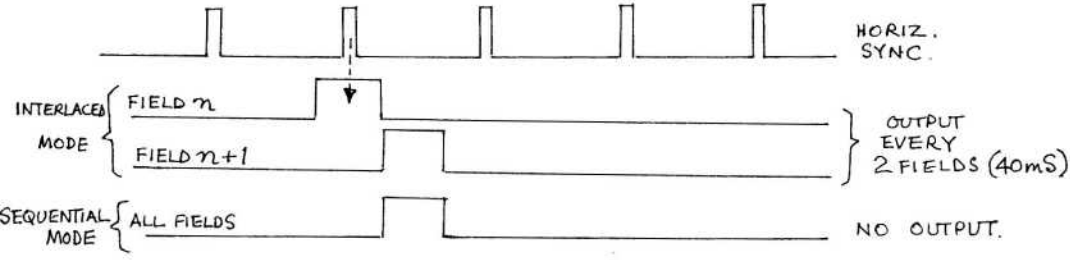


Fig.9 Gating to Detect Interlace.

In fact, the actual circuit can be realised using just one IC (74LS122) and one transistor - see Fig.10. Reference to Fig.4 will show from where the feeds to this circuit are taken. It can be built on a small piece of Veroboard, and stuck with double-sided sticky tape (insulated!) to the top of the UHF modulator. The LED should be mounted at the front, to the right of the keyboard. (Fig.11).

In order to check the operation of the interlace detector, it will be necessary to run a programme (in any mode but 7), and then add a new line with the "interlace toggle" command; this should change the scanning mode when the programme is run. For instance, at the end of this article I have shown a mode 2 program that will generate colour bars with a superimposed callsign.

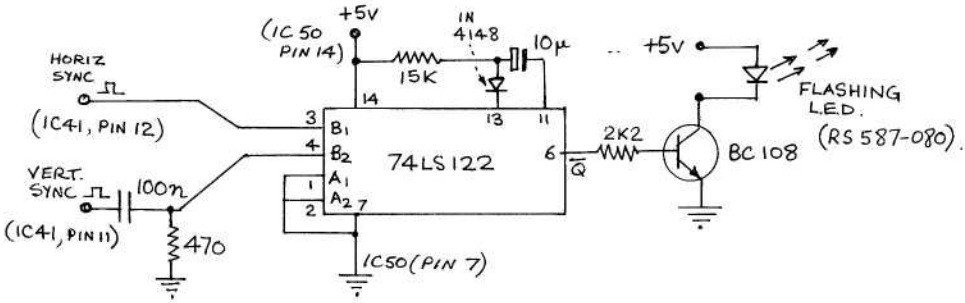


Fig.10 Interlace Detector Circuit.

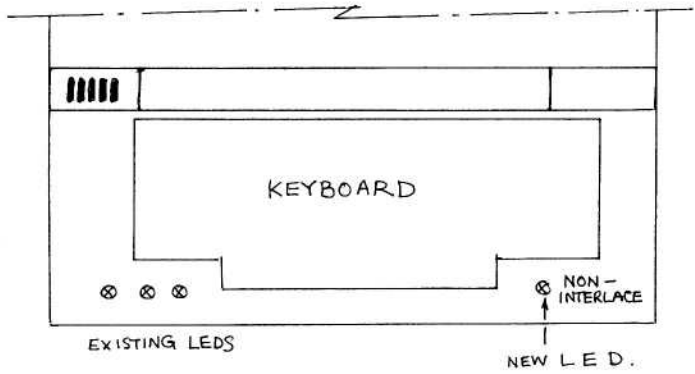


Fig.11 Mounting the LED.

If this program is run, type in as follows:-

```
ESCAPE
25 VDU23,0,8,64,0,0,0,0,0,0
RUN
 and the scanning should change.  To revert,

ESCAPE
25
RENUMBER
RUN
```

I can't say which of the above versions will be interlaced, but the computer should!

Please note that any modifications made to the BBC Micro may invalidate the manufacturer's guarantee. Nevertheless, I am now extremely pleased with the video quality obtained from the modified machine, using an external PAL coder. Perhaps I can now spend some time getting to grips with the software.

Please address any communication concerning the foregoing to me at 58 Linden Crescent, St. Albans, HERTS.

BASIC PROGRAM TO GENERATE COLOUR BARS

```
10  REM "COLOUR BARS"
20  MODE 2
30  FOR A=0 TO 180
40  DRAW A,1024
50  MOVE A,0
60  NEXT A
70  GCOL 0,3
80  FOR B=181 TO 360
90  DRAW B,1024
100 MOVE B,0
110 NEXT B
120 GCOL 0,6
130 FOR C=361 TO 540
140 DRAW C,1024
150 MOVE C,0
160 NEXT C
170 GCOL 0,2
180 FOR D=541 TO 720
190 DRAW D,1024
200 MOVE D,0
210 NEXT D
220 GCOL 0,5
230 FOR E=721 TO 900
240 DRAW E,1024
250 MOVE E,0
260 NEXT E
270 GCOL 0,1
280 FOR F=901 TO 1080
290 DRAW F,1024
300 MOVE F,0
310 NEXT F
320 GCOL 0,4
330 FOR G=1081 TO 1260
340 DRAW G,1024
350 MOVE G,0
360 NEXT G
370 VDU 28,8,30,13,29
380 PRINT "CALL SIGN"     (note 1)
390 VDU 5
400 END
```

note 1 - call sign is for 5 characters
note 2 - to change scanning mode, add line
25 VDU23,0,8,64,0,0,0,0,0,0

30 years ago

The following has been culled from the October 1953 issue of CQ-TV magazine (number 18):-

"WHAT THE OTHER BLOKE IS DOING....." DEPT

Undoubtedly the best effort has been by G2WJ/T, as reported in the Bulletin and Wireless World. On August 1st, G3GDR at Abbots Langley received 2WJ's tv signals on 436Mc/s, and has since repeated the performance several times. The distance is about 35 miles - easily a record for fixed station working in this country; the power used was just 2 watts peak white to the CV53 PA, grid modulated from the photicon line amplifier. I am sure all members will wish to join in congratulating Ralph and Jeremy on this very fine effort. Incidentally, Jeremy is now doing his National Service.

Ian Waters of Ely has been extremely busy; several more shows (we've lost count) plus a lot of overtime involved with the Pye Industrial TV units seen at the Radio Show. Members who saw the gear will note that Ian takes as much care with his professional equipment as with the amateur gear! Ian is now awaiting a medical prior to his call-up.

CIRCUIT NOTEBOOK

NUMBER 38

By John Lawrence GW3JGA

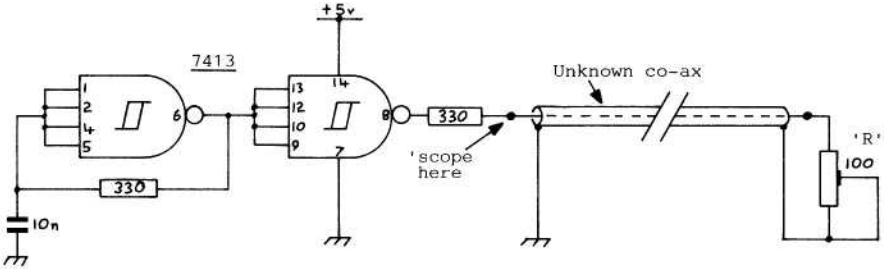
Recently I needed a simple method of measuring the characteristic impedance Z0 (Zed Nought) of a coaxial cable. Actually I was looking at the RS Components 367-577, 4 individually screened conductors in one cable, to see if it would be suitable for carrying RGB and Sync from a BBC micro to several RGB monitors. The characteristic impedance is not quoted by RS, so this is what I did.

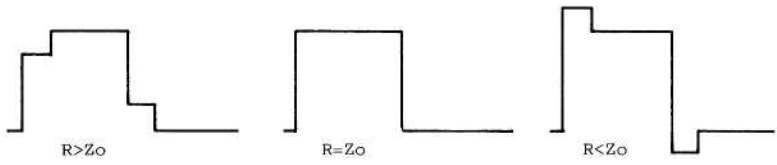
I patched up a simple square-wave generator using a 7413 I.C. to give a good square-wave of approximately 200 KHz. I fed this into the end of one of the coax cables and connected a 100-ohm carbon pre-set pot. across the other.

I monitored the input to the coax with a 'scope, set to 2v/div and 0.5uS/div. I then twiddled the carbon pot. until a clean square-wave was obtained. This indicated that the coax was terminated in it's characteristic impedance and no signal was being reflected. I then unhooked the pre-set control and measured it on the ohms range of my Avo and Bingo! it read 60-ohms.

To confirm the results, I repeated the measurement using a drum of UR46 co-ax - 50-ohms and some TV co-ax - 75-ohms, both checked out within an ohm or two. You need to have at least 10 metres of cable or the pulse propogation time is too short for easy measurement on the usual 10 MHz 'scope.

O.K. the Time Domain Reflectometer is nothing new but this is a lot cheaper than a Hewlett Packard! Going back to the RGB monitor, I paralled the normal 75-ohm termination resistor with 330-ohms, to bring it nearer to 50-ohms, and it worked fine.





VIDEO MODULATOR

By Jean-Pierre PE1AYT

A simple circuit has been received by the Editor which enables an existing transmitter up to around 3 Watts to be directly modulated with a video signal. Although such designs have been published in past issues of this magazine, this version is shown here in Fig.1.

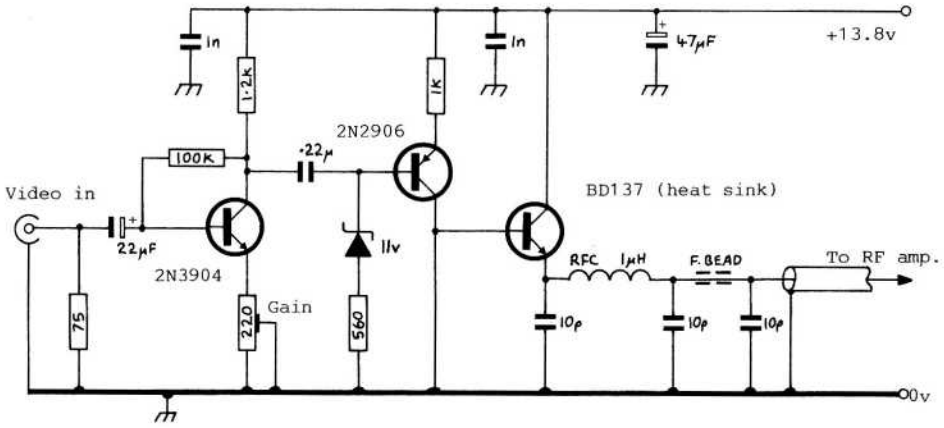


Fig.1 MODULATOR CIRCUIT DIAGRAM

Although the original called for a +15v rail, there should be no reason why it shouln't work fine on 13.8v, because of this the zener diode value has been changed from 12v to 11v.

The circuit of a typical RF amplifier is shown in Fig.2 illustrating how the modulator is connected to it. The PA collector voltage is now obtained from the new modulator. Be sure that any de-coupling capacitors in the modulator output are no larger than about 100pF, otherwise the video high frequencies (colour etc) may be impaired.

The first two transistors show suggested types only since no specification was supplied with the circuit. The BD137 should be fitted with a small heatsink.

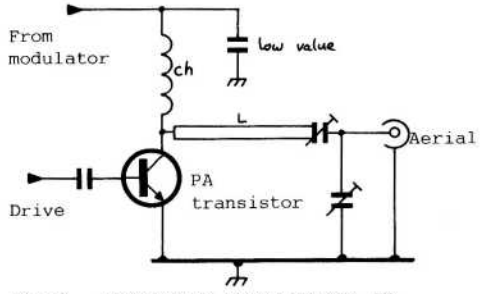


Fig.2 CONNECTION TO A TYPICAL PA

COALVILLE GALA

By Barry Senior M.R.T.S. G8YGT

Over the weekend of the 4th and 5th of June a Gala was held to mark the 150th anniversary of the town of Coalville in Leicestershire.

A demonstration of both amateur radio and television was provided by; (HF bands) G3SBF, G3VDW, G4JDP, (VHF bands) G6SLH, G6SAL and on ATV; G8ZZY, G6SVN and myself G8YGT. Cameras were operated by my two sons Robert and David.

The stations were situated at the Miner's Welfare Centre in Coalville on the roof of which was mounted the Image Orthicon camera shown in the photo. This gave a splendid view of the town and enabled some of the activities which took place within camera range to be televised and relayed to the main station in the building. The stations were on the air on all bands between 1200 and 1800 on each of the two days and many contacts were made. As usual at such events there was much interest shown by the public who, despite having TV thrust at them every day, still take a keen interest in the local TV pictures on display. Perhaps they all have visions (pun) of being TV celebrities themselves one day.

G8YGT at his post in front of the ATV station during a moment of relaxation.
Members will notice the pint of beer at centre left!

Allen G8ZZY pointing out a new camera angle to Barry on the roof of the building.
Want to buy the camera? see 'Market Place'.

A TV ALARM

By I.Waters G8ADE

I have often thought that there is probably more ATV to be seen on the bands than is actually seen. The problem is knowing when it is there. The notion of leaving a receiver running all the time was rejected. Quite apart from energy, heat and tube life considerations, who wants to live with a screen full of noise even assuming one looks in the right direction at the critical moment.

The circuit shown in Fig.1 is incredibly sensitive. It will reliably detect 15.625KHz modulation which is buried many dB under the noise and give an audible alarm. This could of course take any form but is in this case a strident simulation of a two-tone emergency horn! At G8ADE 70cm signals from the receive mast head amplifier are fed via a distribution amplifier to two converters. One, narrow band, feeds a communications receiver covering 432 - 434MHz. The other, a broadband unit covers 434 - 440MHz. The I.F. (36MHz) from this feeds a TV I.F. strip which in turn delivers video and audio at line level to monitors and a speaker/amplifier respectively. The alarm circuit forms part of this TV I.F. strip.

CIRCUIT DESCRIPTION

Composite syncs, from a separator in the I.F. strip (necessary to re-set the a.g.c. circuit [GW8PBX note]) are coupled via a 100pF capacitor to a parallel tuned circuit at line frequency which, in fact, uses a horizontal oscillator stabiliser coil from an old TV set. This signal is buffered by a high impedance input F.E.T. and fed via a "threshold" control to an NE567 IC in a phase locked loop decoder circuit. The detection frequency is set to 15.625KHz by the 10k pot., and when this frequency is detected pin 8 goes low, the following BC214L transistor turns onenabling power to be applied to the alarm tone generator.

The alarm tone is fed via a mixing pad, so that it will be heard regardless of what else may be happening on the station loudspeaker.

The sensitivity is such that the circuit will reliably detect the presence of a TV signal which is so weak that nothing, not even floating diagonal lines, is to be seen in the noise on a monitor screen. The presence of the vertical interval can however JUST be detected in the noise on a waveform monitor. The detection is however quite positive as the alarm will cease when the aerial is disconnected. This sensitivity may seem somewhat of an overkill but in practice it allows for the converter being a bit off tune (in practice tuned to 435MHz) and/or for beam heading.

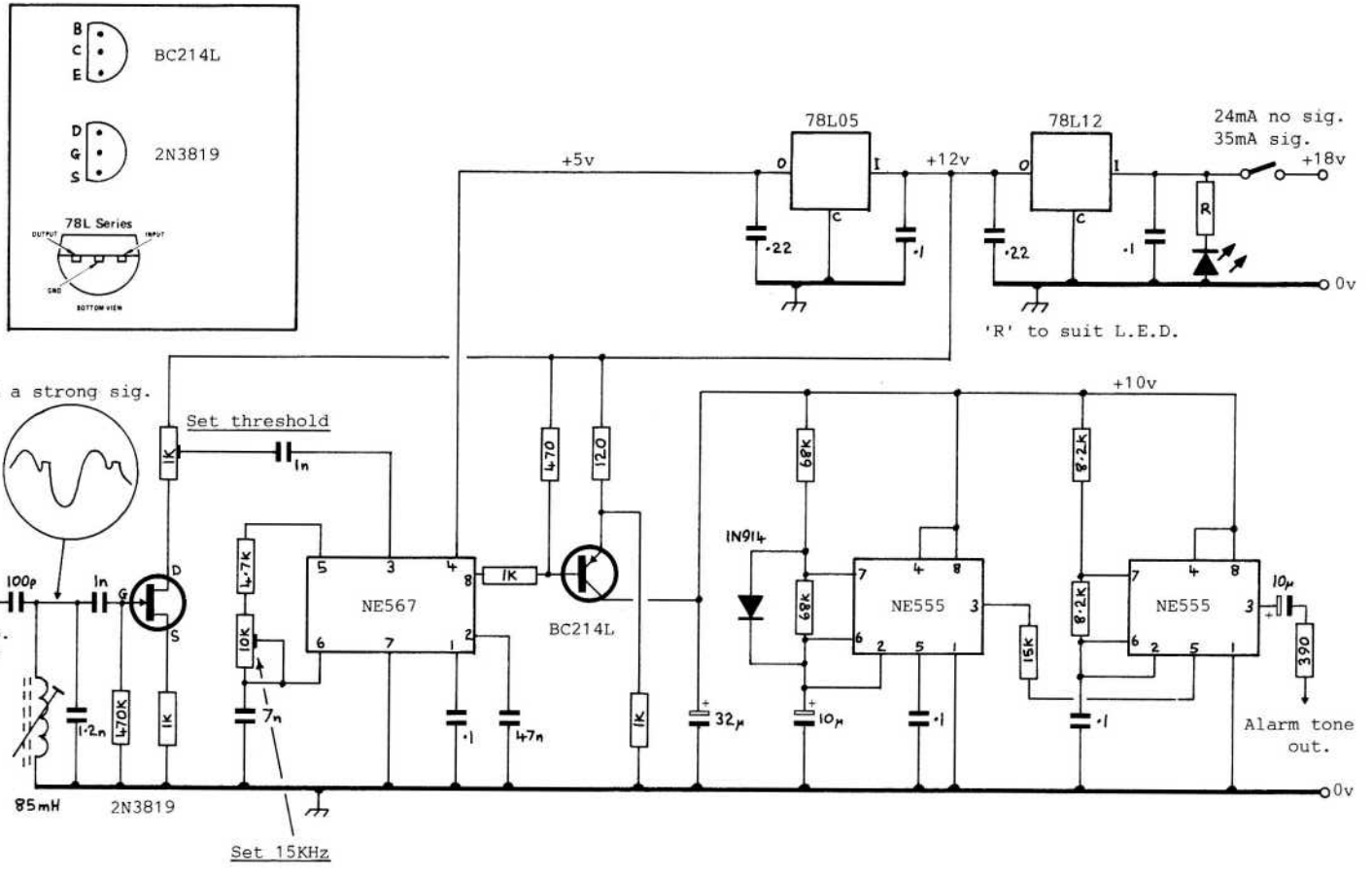


Fig.1 CIRCUIT DIAGRAM OF T.V. ALARM.

ADJUSTMENT

Tune to a strong signal, look with a 'scope on the drain of the F.E.T and tune the 85mH coil for maximum sinewave. Now tune to a weak signal and adjust the 10k pot to mid-travel during which pin 8 goes low. Disconnect the aerial and adjust the 1k "threshold" pot. so that the circuit is just not giving a chattering output on noise.

The power switch allows the alarm (racket!) to be shut off once a signal has been identified but the associated L.E.D. shows at a glance whether the system has been left in the "armed" state.

HANDBOOK 2 NOTES

70cm ATV TRANSMITTER

Following the paragraph under 'News Roundup' in the last issue concerning coil formers, it seems that some difficulty is also being experienced in obtaining suitable ferrite cores.

Two solutions can at present be offered:
1) Cheap and cheerful. Tube cores similar to those in the original design. These resonate with about 15 - 22pF at 39MHz. Members Services has stocks of these which cost 20p for a set of 6 (please add 16p postage unless ordering other items as well).

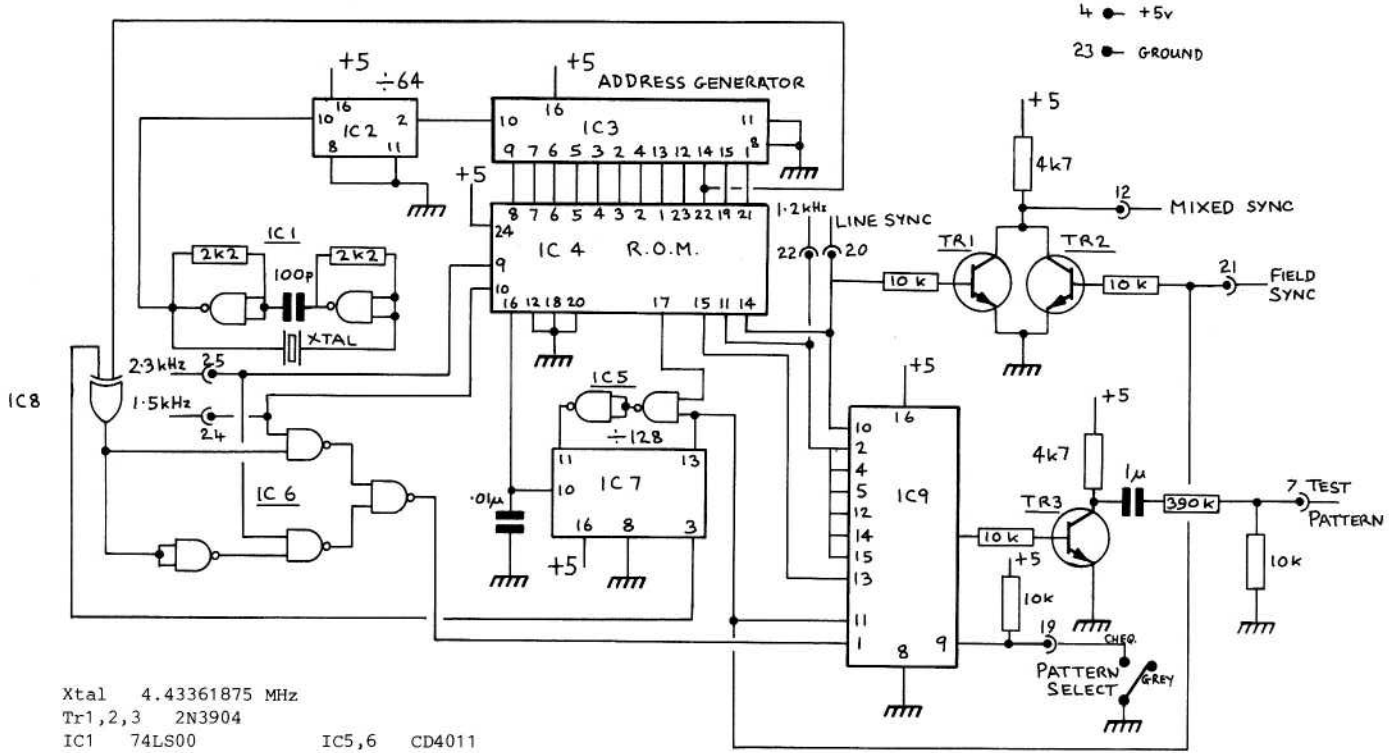
2) Not quite so cheap. Use three 2-hole beads end to end thus;

with windings as for two tubes side by side. These are Siemens manufacture and their part number is: B62152-A0007-X001. They are a stock item at Electrovalue, 28 St.Judes Road, Englefield Green, Egham, Surrey TW20 0HB. The price (at the time of writing) is 0.18p each plus VAT plus 40p postage. The constructor would need nine cores.

There is a 40p small order surcharge if the order total before VAT is less than £5. The transformer with these cores resonated with about 18pF across it. The critical transformer is 2T1 in the modulator, as the other two are fairly well damped.

Paul Marshall (the designer) comments that the second type seem better (more output and higher Q) although both seem to work OK.

Thanks to Paul Marshall and Peter Delaney for supplying this information.



Xtal 4.43361875 MHz
Tr1,2,3 2N3904

IC1	74LS00	IC5,6	CD4011
IC2,3,7	CD4040	IC8	CD4070
IC4	2732 PROM	IC9	CD4051

SSTV SYNC GENERATOR MODIFIED CIRCUIT

SSTV SPG

Here are some notes from Trevor Brown concerning amendments to the SSTV sync pulse generator (Handbook 2 page 8). These comprise corrections to some errors which crept into the original article, and also some improvements.

The 4.43MHz oscillator has been re-designed using a 74LS00, as the old one unlocked on some cuts of crystals.

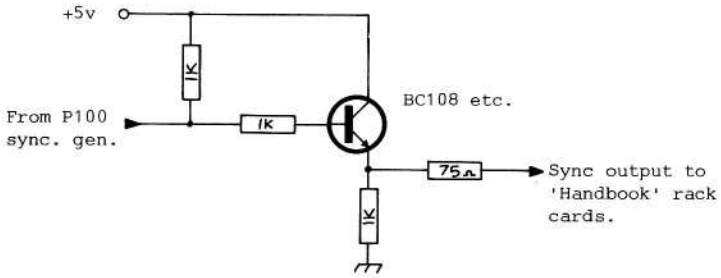
The ÷128 output is on IC7 pin 13 (NOT pin 14).
The ROM does not have two pin 15's - one is in fact pin 16.
The CD4030 (now obsolete) is replaced by a CD4070 and moved to its correct circuit location.

The Club PCB conforms to this new circuit and both the PCB and the PROM required are now available from Members Services. For the sake of clarity, the amended circuit is shown here and the appropriate edge connector pins are marked accordingly.

SYNC DRIVING PROBLEMS

Some members are experiencing difficulty in driving video boards from Handbooks 1 and 2 from the P100 sync pulse generator. The problem is that the outputs from the SPG are at TTL level whereas the input requirements for the video system boards are standard line levels across 75-ohms.

The following interface circuit converts the TTL signals to line level and should be wired between the SPG and the board drive inputs.



Did you know....

....that some home video recorders will tune down to 70cm? In particular, the Panasonic NV8600 and NV7000 seems to consistently tune down this far. So if you're looking out for a second-hand VHS machine, it might be worth considering one of these models.

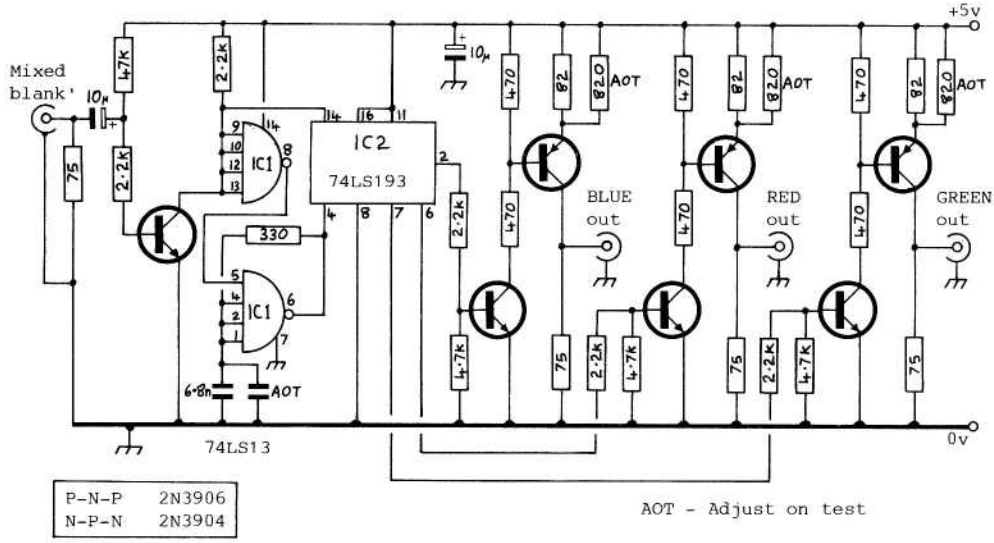
COLOUR BAR GENERATOR

In CQ-TV 123 an article by John Goode describing a PAL coder mentioned the use of a colour bar generator. This generator, by Nigel Walker G8AYC, was described in an earlier BATC handbook - now out of print.

Several enquiries have been received about this unit and in response to these the circuit is re-produced below.

This design uses the outputs of the last three divide by two in IC2 to generate the desired waveform. This particular IC was chosen for two reasons: Firstly, it is a synchronous divider , which means that all the waveform transitions occur at the same time, secondly, it is used in the 'count down' mode to produce the correct sequence for the colour bars, i.e. after reset, the first count produces all 1's etc. The two-transistor output stages produce glitch-free 0.7v outputs across 75-Ohms.

Synchronous drive is obtained from a mixed blanking input. The transistors specified may be replaced by many low frequency switching types.



COLOUR BAR GENERATOR

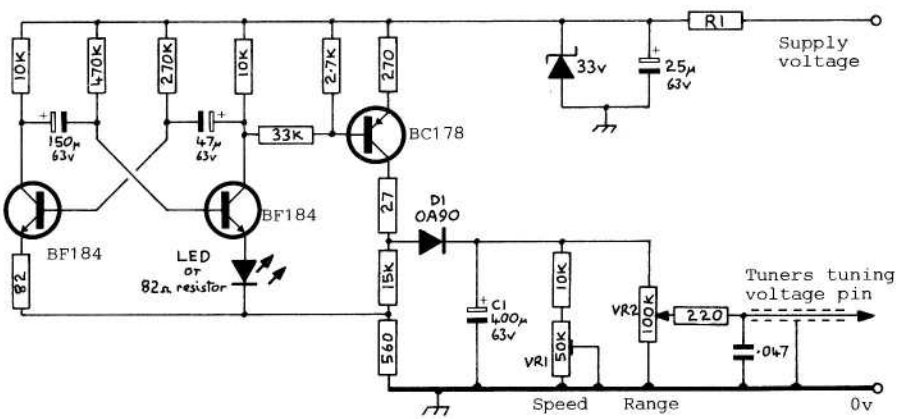
TV SCANNER

Well we've had frequency scanners on VHF and UHF transceivers for a long time now so how about trying it on TV?

The circuit shown below is by Brian Williams and was spotted in the October 1981 issue of 'Television' magazine in Roger Bunney's column 'Long-Distance Television'. My thanks to the Editor for permission to publish the circuit here.

The unit is intended to control the tuning voltage of a varicap TV tuner by providing a steadily falling voltage causing the tuner to sweep across a band - or part of a band - of frequencies defined by the controls provided.

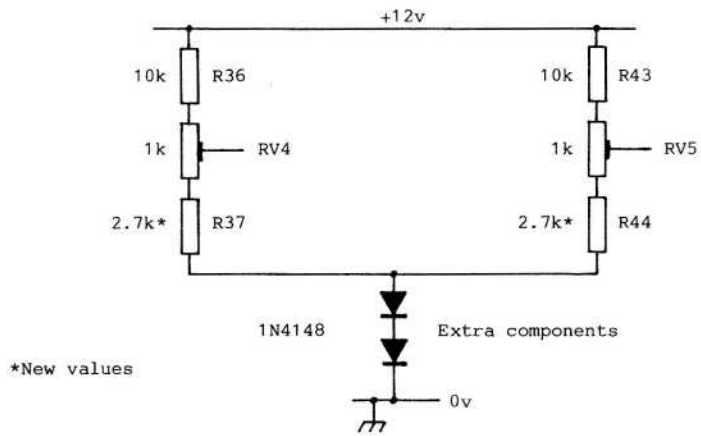
C1 is periodically charged and discharged to provide the band-sweep tuning voltage. Tr1 and Tr2 form a slow-speed multivibrator which switches Tr3 on and off. When Tr3 conducts, C1 charges quickly via D1 etc. from the 33v rail. When Tr3 is off, C1 discharges slowly via the parallel potentiometer network. The charging time is about three seconds and the sweep time two minutes, h.f. to l.f. The LED is included to show the charge, but if this facility is not required, the LED should be replaced by an 82-ohm resistor. Due to the exponential discharge curve, the sweep is slowest at the l.f. end; to partially offset this effect, R2 is included. R1 is relected to suit the supply rail used however, if a well regulated 33v supply is available this resistor together with the 33v zener diode may be dispensed with.



THE HANDBOOK CODER REVISITED

Following an observation in CQ-TV123 (p.7) that the "Handbook" colour coder is prone to temperature instability, Brian Wade G8ABD has sent details of a simple modification to overcome the problem.

"The carrier balance stability can be improved by a simple change to the adjustment circuitry as follows:



Carefully adjust RV4 and RV5 as described in the handbook - after the complete system has warmed up.

Since carrying out the modification to my own coder I find that it settles down in under a minute and I havn't had to re-adjust the controls in over 12 months.

I have also found it beneficial to increase C7 and C11 to 1uF to eliminate subcarrier streaking after the red/white bars when coding the composite pattern of the Handbook Colour Test Card Generator."

BAIRD MUSEUM

A potted history of the development of television in this country is to be seen at the new Baird Museum, opened by Mrs. Margaret Baird on January 28th this year, in Relay House, the Percy Street, Swindon, headquarters of Radio Rentals.
The date chosen for the opening ceremony, January 26, marks the anniversary of the first occasion on which John Logie Baird gave a public demonstration of his new invention. Close association with his widow has been maintained by Radio Rentals over the years through the award of the annual John Logie Baird travelling bursary, and Mrs. Baird has now made the special trip from her home in South Africa to open the new museum for the company.

Designed by Richard Daynes, F.S.I.A., the new museum brings to life the story of television, not only in working models and pictures but also in sound with recordings of some of the memorable moments in broadcasting history, including Leslie Mitchell's 1936 announcement of the start of BBC test transmissions from Alexandra Palace and Neville Chamberlain's famous "Peace in our Time" speech.

Two Baird sets, a 30-line television and mirror drum receiver will be on display among many other pieces of evocative equipment, which include a Fultograph machine, a 1920's device for sending pictures by wire that aroused more than a little interest in the corridors of the BBC for a while. Some of the earliest TV sets, including Radio Rentals' first colour receiver available at 25 shillings per week, have a special place in the museum, so too has an early Scophony Baird reel-to-reel audio tape recorder.

The series of walk-around booths, designed especially for V.I.P. visitors and student tours, finishes with the new technology developments such as data text, teletext, cable and satellite.

Applications from groups wishing to visit the new museum should be addressed to:-

Mrs. Christine Reid,
Radio Rentals Limited,
Relay House,
Percy Street,
Swindon,
Wiltshire SN2 2BB

Tel: 0793 21121
Ext. 243

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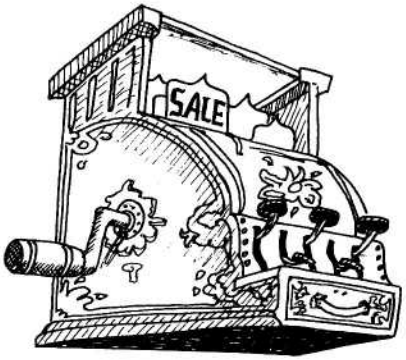
Also available QRA calculator programs for the ZX81, Spectrum, B.B.C. and Dragon at only £2·50 inc P&P.

Database and Morse tutor for the spectrum, both for only £4·50 inc. P&P.

B.B.C. and Dragon versions of ATV will shortly be available, drop me a line for the up to date situation.



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PHILIPS type CMT radio-telephone, 68-88MHz £25 + £2 p&p.
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A.C.Electronic Services. 17 Appleton Grove, LEEDS LS9. Tel: 0532 496084.

FERGUSON Videostar colour camera, type 3V20A, x6 zoom and macro. Also carrying case, tripod and spare lead £375. M/M TV transmitter, 3-months old £115. 48el 70cm Multibeam £25.
John Goodier G4KUB 35 Rose Lane, Marple, Nr.Stockport, Cheshire SK6 6DS.

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A FEW 'scope tubes, some electrostatic, 3FP7 crt's etc. Plus a few 5FP7 CRT's, scan coils and focus units available plus a lot of other gear. Prefer swaps for anything interesting.
J.Brown G8LPB 45 Marlborough Avenue, Falmouth, Cornwall TR11 4HS

PYE MkIII Image Orthicon mono studio camera. Complete channel including CCU, SPG and PSU, also cables, 3 lenses, spares, manuals etc. Good working order, used regularly (see item in this issue about the Coalville Gala) £75.
Barry Senior G8YGT, 1 Bedale Close, Coalville, Leicester LE6 2BA. Tel: 0533 32088.

DELAY LINES. Surplus colour TV delay lines. 0.60p each including postage.
BATC Members Services, 6 East View Close, Wargrave, BERKS RG10 8BJ.

G8GQS REDUNDANT EQUIPMENT LIST

COLOUR camera, Marconi Mk7 studio camera, price reduced for quick sale; 'phone.
MARCONI NTSC coder, as new condition £25.00
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MARCONI modules:- A/B mixer, sync separator, 5-way switch, isolation amps.
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PYE PAL/NTSC decoders in ISEP 19" rack £25.00
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Brian Summers G8GQS, 13 Church Street, Gainsborough, Lincs. Tel: 0427 3940 (evenings)

BOSCH 30mm Plumbicon camera with CCU and cable. No viewfinder. Lens mount is M42 (Pentax thread), requires pulse drives. £30.
TOKINA 35-105mm 'One Touch' zoom lens for above, never been used since new! Can be used on a film camera as well. Cost £135 offers over £60.
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David Wilson, 4 Harkness Close, Bletchley, Milton Keynes, Bucks MK2 3NB. Tel: 0908 641234.

MARCONI V322 viewfinder vidicon camera. Professional quality, four lens turret, full manual. On the large side but can deliver to Leicester functions or by arrangement. £50 or offer.
BUILDING A CAMERA? Two chassis with scan coils and lens mount, £2. each or will bring to Leicester. These are not new but quite compact.
AN APOLOGY: I am sorry that the poor rxchange rate means that the PC Electronics modules and Motorola 'blue bricks' I used to supply are no longer as good value as they once were. The MHW-710 is still cheaper from the States than from UK suppliers, however. Complete with heatsink and PCB with decoupling components it costs $89 (work out current exchange conversion) plus £2.50 air mail and insurance. Blean Video Systems is no longer in Blean (I suppose I should call it Midshires Microwave now!) so send your loot. I still supply the full Fortop range, of course and will be happy to send full details for a SAE.
Andrew Emmerson G8PTH, 71 Falcutt Way, Northampton, NN2 8PH. Tel: 0604 844130

IKEGAMI CAMERAS, B&W 625, composite video output. With lenses £40 and £60. Ex-computer keyboards £5. MONITORS, various from £20. Inspect and collectG8EGG. Tel: (evenings) 0428 734645

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D.Hemingway, Ivanhoe, Glen Road, Hindhead, Surrey GU26 6QE

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HELP! I need to acquire a 405-line TV signal source (with sound) to run my collection of 405 VHF vintage televisions - after transmissions cease next year. To this end I seek a pattern generator (optical/Monoscopic test card or electronic) and a VHF bands I/III modulator (ideally to broadcast standards). I would particularly like to obtain a test card C or D source.
Dave Hazell. 36 Park Road, Northleigh, Witney, Oxon OX8 6RX Tel: 0993 882238 (home) or 0734 55977 ext. 2593 (office).

SSTV GEAR. Suitable TV camera, scan-converter, computer with interface and software to provide output to dot matrix printer, suitable printer.
L.Damon G3CPG. 1 Layton Avenue, Malvern, Worcs WR14 2ND

VALVE data manual for Avo Valve Tester types VCM Mk3 and CT160. Also instruction manual for CT160.
TO BUY OR BORROW for photocopying, instruction and service manual for Shibaden SV700ED VTR. Also wanted, set of video heads for same. (NB. This is a repeat advert as I was away when the last one was published and may have missed some 'phone calls!)
Chris Maxwell G8MKT 24 Jensen, Tamworth, Staffs B77 2RH Tel: 0827 285949

ANY INFO on the following three cameras:- Sony CVC 2100 ACE, Ikegami CTC 4500 type M, Ikegami VR611. Also on 11" solid-state picture monitor produced by E.C.S. Ltd of Newark, Notts.Andie Wilkes G4NTV. 34 Tideswell Road, Great Barr, Birmingham B42 2DT. Tel: 021 525 5445 (office hours).

SWAP for 70cm ATV outfit. Trio 2300 portable transceiver together with 25 Watt linear and Ham Master 4500.
Ask for Jim G6XMY or Graham G6LMG on Ambergate 6159. J.Stokes, 47 Riber Avenue, Somercotes, Derbyshire.

LINE output transformer for Philips K80 CTV. T.J.Roche, 2 Chaucer Green, Acocks Green, Birmingham B27 7RE

MONOSCOPE tubes still wanted, also old microwave and radar junk and textbooks.
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